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NPTEL (https://swayam.gov.in/explorer?ncCode=NPTEL) » **Deep Learning For Visual Computing (course)**

Announcements (announcements)   **About the Course (https://swayam.gov.in/nd1_noc20_ee74/preview)**   Ask a Question (forum)

Progress (student/home)   Mentor (student/mentor)

Unit 2 - Week 0

Course outline

How does an NPTEL online course work?

Week 0

○ **Quiz : Assignment 0 (assessment? name=115)**

Assignment 0

Assignment not submitted   **Due date: 2020-07-20, 23:59 IST.**

1)   Given $F(x, y) = 2\sin(2x) + y$. Determine $\frac{\partial F}{\partial x}$ at $x = 30°$.   *1 point*

         a. 2

         b. 3

         c. 1

         d. 0

○ a.

○ b.

○ c.

○ d.

2)

1 point

Given $y = e^{3x} + \cos(5x) + \ln(x)$. Determine $\frac{dy}{dx}$

a. $3e^{3x} + 5\sin(5x) + \frac{1}{x}$

b. $3e^{3x} - 5\sin(5x) + \frac{1}{x}$

c. $e^{3x} - 5\sin(x) + \frac{1}{x}$

d. $e^{3x} + 5\sin(x) + \frac{1}{x}$

○ a.

○ b.

○ c.

○ d.

3)

1 point

Given that $y = \lim_{x \to \infty} \left(\sqrt{x + \sqrt{x}} - \sqrt{x - \sqrt{x}} \right)$, determine $\frac{dy}{dx}$.

a. 1

b. 0

c. $\sqrt{x}$

d. Doesn't exist

○ a.

○ b.

○ c.

○ d.

4)   **1 point**

Determine the condensed form of $f(x) = \dfrac{1}{1 + \frac{1}{1 + \frac{1}{x}}}$.

a. $\dfrac{x^2+1}{2x+1}$

b. $\dfrac{x+1}{2x+1}$

c. $\dfrac{2x+1}{x+1}$

d. $\dfrac{2x+1}{x^2+1}$

○ a.

○ b.

○ c.

○ d.

5)   **1 point**

Characteristic equation for the matrix X is given as, $2t^2 + t = 1$. Which of the following is true for X?

a. $X^{-1} = X$

b. $X^T = X^{-1}$

c. $X^{-1} = 2X + I$

d. $X = 2X^{-1} + 1$

○ a.

○ b.

○ c.

○ d.

6) How many solutions of x, y, z exists for the given set of equations?

1 point

$$2x - y + 3z = 1$$
$$3x - 2y + 5z = 2$$
$$-x + 4y + z = 3$$

a. 0

b. 1

c. 3

d. Infinite

○ a.

○ b.

○ c.

○ d.

7) Given that the Eigen values of the matrix $\begin{bmatrix} x & y \\ 3 & 5 \end{bmatrix}$ are 2 and 1, find the values of x and y.

1 point

a. $x = 0, y = 1$

b. $x = 10, y = 12$

c. $x = -3, y = -6$

d. $x = -2, y = -4$

○ a.

○ b.

○ c.

○ d.

8) **1 point**

Given that X and Y are non-zero square matrices, what does $XY = 0$ imply?

a. X and Y are orthogonal

b. X and Y are nil potent

c. X or Y has rank < 3

d. $Y = X^{-1}$

○ a.

○ b.

○ c.

○ d.

9) **1 point**

Let $X = \begin{bmatrix} 1 & 1 & -1 \\ 0 & 0 & 1 \\ 0 & 1 & -1 \end{bmatrix}$. Then $|XX^T + 1|^T =$?

a. 0.25

b. 6

c. $\begin{bmatrix} 4 & 0 & 3 \\ 0 & 2 & 0 \\ 3 & 0 & 3 \end{bmatrix}$

d. $\begin{bmatrix} 3 & -1 & 2 \\ -1 & 1 & -1 \\ 2 & -1 & 2 \end{bmatrix}$

○ a.

○ b.

○ c.

○ d.

10)   *1 point*

Which operation can be used to map $\begin{bmatrix} 1 & 9 & 3 \\ 6 & 3 & 4 \\ 2 & 9 & 8 \end{bmatrix}$ to the value 4?

    a. Mean

    b. Median

    c. α-clipping

    d. Histogram equalization

○ a.

○ b.

○ c.

○ d.

11)   *1 point*

Find the bound of the function, $f(x) = \frac{1-e^{-x}}{1+e^{-x}}$, when $x \in [0, \infty)$.

    a. $[0.5, \infty)$

    b. $(-\infty, \infty)$

    c. $(-\infty, 1)$

    d. $[0,1)$

○ a.

○ b.

○ c.

○ d.

12)   **1 point**

Consider two independent random variables X and Y with variance $\sigma^2{}_X$ and $\sigma^2{}_Y$ respectively. What is the variance of $X - Y$?

a. $\sigma^2{}_X + \sigma^2{}_Y$

b. $\sigma^2{}_X - \sigma^2{}_Y$

c. $\dfrac{(\sigma_X - \sigma_Y)^2}{4}$

d. $\dfrac{\sigma^2{}_X + \sigma^2{}_Y}{2}$

○ a.

○ b.

○ c.

○ d.

13)   **1 point**

What percentage of the data population is located within $\mu \pm 2\sigma$ range when the data follows Gaussian distribution?

a. 75

b. 95

c. 66

d. 50

○ a.

○ b.

○ c.

○ d.

14)   **1 point**

Given two discrete distributions $p(\cdot)$ and $q(\cdot)$, distance between them can be measured using $d_1(p||q) = \sum_i p_i \log\left(\frac{p_i}{q_i}\right)$ or $d_2(p||q) = \sum_i p_i \log\left(\frac{p_i}{M}\right) + \sum_i q_i \log\left(\frac{q_i}{M}\right)$, where M is a constant. Which of the following about the symmetry of the distance measures is true?

      a. Both $d_1(p||q)$ and $d_2(p||q)$ are asymmetric
      b. Both $d_1(p||q)$ and $d_2(p||q)$ are symmetric
      c. $d_1(p||q)$ is symmetric and $d_2(p||q)$ is asymmetric
      d. $d_1(p||q)$ is asymmetric and $d_2(p||q)$ is symmetric

○ a.
○ b.
○ c.
○ d.

15)   **1 point**

Consider an array $A = \{A_1, A_2, \dots, A_n\}$, where $A_i \in Z \cap [0, y]$. If y is an integer, how many such unique arrays can exist?

      a. $(y + 1)^n$
      b. $\binom{n}{y+1}$
      c. y^n
      d. ny

○ a.
○ b.
○ c.
○ d.

16)   **1 point**

Given $f(x) = \dfrac{x^3 - 3x^2 + 3x - 2}{2x^3 + x^2 - 8x - 4}$, which is not differentiable at $x = 2$. What could be an exception value of $f(x = 2)$ such that $f(x)$ is continuous?

    a. 0

    b. $\dfrac{3}{13}$

    c. $\dfrac{3}{20}$

    d. None of these

○ a.

○ b.

○ c.

○ d.

17)   If $y = \dfrac{1}{1 + e^{-x}}$, what is $\dfrac{dy}{dx}$?   **1 point**

    a. $\dfrac{dy}{dx} = 1 - y$

    b. $\dfrac{dy}{dx} = y(1 - y)$

    c. $\dfrac{dy}{dx} = \dfrac{1 + y}{1 - y}$

    d. $\dfrac{dy}{dx} = \dfrac{1}{(1 - y)^2}$

○ a.

○ b.

○ c.

○ d.

18)   **1 point**

Consider two 3-D tensors X and Y whose contents are,

$$X(:,:,0) = X(:,:,1) = X(:,:,2) = \begin{bmatrix} 1 & 3 & 1 \\ 6 & 4 & 0 \\ 5 & 2 & 5 \end{bmatrix}$$

$$Y(:,:,0) = Y(:,:,1) = Y(:,:,2) = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix}$$

If the convolution operation is given as $Z = X * Y$, find $Z(:,:,1)$.

a. $[18]$

b. $\begin{bmatrix} 1 & 3 & 1 \\ 6 & 4 & 0 \\ 5 & 2 & 5 \end{bmatrix}$

c. $[10]$

d. $\begin{bmatrix} 2 & 4 & 2 \\ 6 & 4 & 1 \\ 6 & 2 & 5 \end{bmatrix}$

○ a.

○ b.

○ c.

○ d.

19) Which of the following filter kernels can be used for gradient computation?

1 point

a. $\begin{bmatrix} 1 & 2 & 1 \\ 0 & 0 & 0 \\ -1 & -2 & -1 \end{bmatrix}$

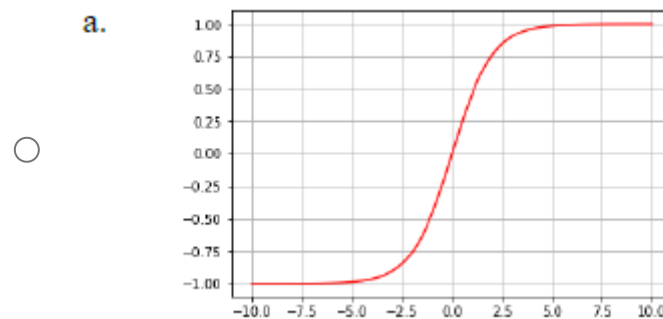b. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

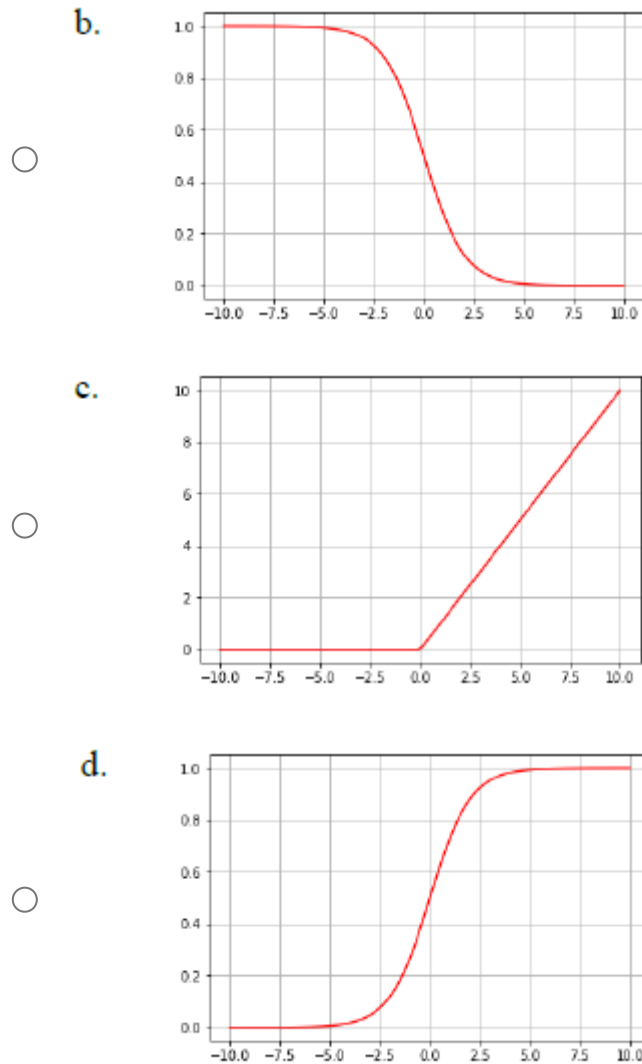c. $\begin{bmatrix} 1 & 1 & 1 \\ 2 & 2 & 2 \\ 3 & 3 & 3 \end{bmatrix}$

d. $\begin{bmatrix} 1 & 1 & 1 \\ 1 & -8 & 1 \\ 1 & 1 & 1 \end{bmatrix}$

- ○ a.
- ○ b.
- ○ c.
- ○ d.

20) Which of the following graphs depict the function $f(x) = \frac{1}{1+e^{-x}}$ for $x \in [-\infty, \infty]$.

1 point

a.

○

b.

c.

d.

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

Check Answers

Submit Answers