Congratulations! You passed!

Grade received 100% **Latest Submission Grade** 100% **To pass** 80% or higher

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1. In logistic regression given the input $\mathbf{x}$, and parameters $w \in \mathbb{R}^{n_x}, b \in \mathbb{R}$, how do we generate the output $\hat{y}$?

1 / 1 point

- ( ) $W\mathbf{x} + b$
- ( ) $\sigma(W\mathbf{x})$
- ( ) $\tanh(W\mathbf{x} + b)$
- (•) $\sigma(W\mathbf{x} + b)$.

Expand

Correct
Right, in logistic regression we use a linear function $W\mathbf{x} + b$ followed by the sigmoid function σ, to get an output y, referred to as ŷ, such that $0 < \hat{y} < 1$.

2. Which of these is the "Logistic Loss"?

1 / 1 point

- (•) $\mathcal{L}^{(i)}(\hat{y}^{(i)}, y^{(i)}) = -(y^{(i)}\log(\hat{y}^{(i)}) + (1 - y^{(i)})\log(1 - \hat{y}^{(i)}))$
- ( ) $\mathcal{L}^{(i)}(\hat{y}^{(i)}, y^{(i)}) = \mid y^{(i)} - \hat{y}^{(i)} \mid$
- ( ) $\mathcal{L}^{(i)}(\hat{y}^{(i)}, y^{(i)}) = \mid y^{(i)} - \hat{y}^{(i)} \mid^2$
- ( ) $\mathcal{L}^{(i)}(\hat{y}^{(i)}, y^{(i)}) = max(0, y^{(i)} - \hat{y}^{(i)})$

Expand

Correct
Correct, this is the logistic loss you've seen in lecture!

3. Consider the Numpy array x:

1 / 1 point

$x = np.array([[[1], [2]], [[3], [4]]])$

What is the shape of x?

- ( ) (2, 2)
- ( ) (4,)
- ( ) (1, 2, 2)
- (•) (2,2,1)

Expand

Correct

Yes. This array has two rows and in each row it has 2 arrays of 1x1.

4. Consider the following random arrays a and b, and c:

1 / 1 point

$a = np.random.randn(3, 4)$ # $a.shape = (3, 4)$

$b = np.random.randn(1, 4)$ # $b.shape = (1, 4)$

$c = a + b$

What will be the shape of c?

- c.shape = (3, 4)
- c.shape = (1, 4)
- c.shape = (3, 1)
- The computation cannot happen because it is not possible to broadcast more than one dimension.

Expand

Correct
Yes. Broadcasting is used, so row b is copied 3 times so it can be summed to each row of a.

5. Consider the two following random arrays a and b:

1 / 1 point

$a = np.random.randn(4, 3)$ # $a.shape = (4, 3)$

$b = np.random.randn(1, 3)$ # $b.shape = (1, 3)$

$c = a * b$

What will be the shape of c?

- c.shape = (4, 3)
- The computation cannot happen because it is not possible to broadcast more than one dimension.
- c.shape = (1, 3)
- The computation cannot happen because the sizes don't match.

Expand

Correct
Yes. Broadcasting is invoked, so row b is multiplied element-wise with each row of a to create c.

6.

1 / 1 point

Suppose you have n_x input features per example. If we decide to use row vectors $\mathbf{x}_j$ for the features and $X = \begin{bmatrix} \mathbf{x}_1 \\ \mathbf{x}_2 \\ \vdots \\ \mathbf{x}_m \end{bmatrix}$.

What is the dimension of X?

- (n_x, n_x)
- (n_x, m)

- [x] (m, n_x)
- [ ] $(1, n_x)$

Expand

Correct
Yes. Each $\mathbf{x}_j$ has dimension $1 \times n_x$, X is built stacking all rows together into a $m \times n_x$ array.

7. Consider the following array:

1 / 1 point

$a = np.array([[2, 1], [1, 3]])$

What is the result of $np.dot(a, a)$?

- [ ] $\begin{pmatrix} 4 & 2 \\ 2 & 6 \end{pmatrix}$
- [x] $\begin{pmatrix} 5 & 5 \\ 5 & 10 \end{pmatrix}$
- [ ] $\begin{pmatrix} 4 & 1 \\ 1 & 9 \end{pmatrix}$

Expand

Correct
Yes, recall that * indicates the element wise multiplication and that np.dot() is the matrix multiplication. Thus
$\begin{pmatrix} (2)(2)+(1)(1) & (2)(1)+(1)(3) \\ (1)(2)+(3)(1) & (1)(1)+(3)(3) \end{pmatrix}$.

8. Consider the following code snippet:

1 / 1 point

$a.shape = (3, 4)$

$b.shape = (4, 1)$

for i in range(3):

for j in range(4):

c[i][j] = a[i][j] + b[j]

How do you vectorize this?

- [x] c = a + b.T
- [ ] c = a.T + b
- [ ] c = a.T + b.T
- [ ] c = a + b

Expand

Correct

9. Consider the following arrays:

1 / 1 point

$a = np.array([[1, 1], [1, -1]])$

$b = np.array([[2], [3]])$

$b = np.array([[2], [3]])$

$c = a + b$

Which of the following arrays is stored in c?

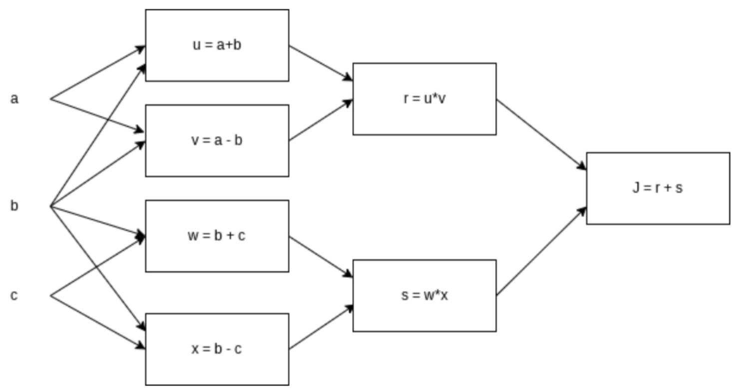
- ( ) $\begin{pmatrix} 3 & 3 \\ 3 & 1 \\ 4 & 4 \\ 5 & 2 \end{pmatrix}$
- ( ) $\begin{matrix} 3 & 4 \\ 3 & 2 \end{matrix}$
- (•) $\begin{matrix} 3 & 3 \end{matrix}$

Expand

Correct
Yes. The array b is a column vector. This is copied two times and added to the array a to construct the array c.

10. Consider the following computational graph.

1 / 1 point



What is the output of J?

- ( ) $a^2 + b^2 - c^2$
- ( ) $a^2 - b^2$
- (•) $a^2 - c^2$
- ( ) $(a - b) * (a - c)$

Expand

Correct
Yes. $J = r + s = u * v + w * x = (a + b) * (a - b) + (b + c) * (b - c) = a^2 - b^2 + b^2 - c^2 = a^2 - c^2$.