

Linear Regression Questions (Make Sure to watch the videos 1st)

Quiz Question

Which of the following are related to bias in machine learning

- ☐ Images, text, video, and speech are all types of data that can contain bias
- ☐ Since the data we used to train the model can contain bias, that could be reflected in the model.
- ☐ Statistical validation can offset the bias reflected in the real-world validation of your models.

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Write A, B, or C here (you can choose more than one answer if there is): __ **A & B**

Let's say that we have a line whose equation is $y = -0.6x + 4$. For the point $(x,y) = (-5, 3)$, apply the **absolute trick** to get the new equation for the line, using a learning rate of $\alpha = 0.1$.

Report your answer in the form $y = w_1x + w_2$, substituting appropriate values for w_1 and w_2 .

Enter your response here: __ $-0.6*(-5) + 4 = 3 + 4 = 7$
 $\text{Error} = y - y_{\text{pred}} = 3 - 7 = -4$
 $w1_{\text{new}} = w1 - \alpha \cdot (\text{Error} \cdot x)$
 $= -0.6 - 0.1(-4 \cdot -5)$
 $= \underline{-2.6}$
 $w2_{\text{new}} = w2 - \alpha \cdot (\text{Error})$
 $= 4 - 0.1 \cdot -4$
 $= \underline{4.4}$
 $y = -2.6x + 4.4$

Let's say that we have a line whose equation is $y = -0.6x + 4$. For the point $(x,y) = (-5, 3)$, apply the **square trick** to get the new equation for the line, using a learning rate of $\alpha = 0.01$.

Report your answer in the form $y = w_1x + w_2$, substituting appropriate values for w_1 and w_2 .

Enter your response here: _____

Quiz Question

Which of the following are true about gradient descent?

- ☐ Gradient descent is a strategy that helps minimize the error between points of the actual data and the "best-fit line"
- ☐ Gradient descent is a strategy that helps isolate outliers in the data.
- ☐ We use gradient descent to update the parameters of our model as we train

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Write A, B, or C here (you can choose more than one answer if there is): __ A & C

Quiz Question

Which of the following are accurate statements about 'mean absolute error'?

- ☐ It is the sum of all the errors divided by m
- ☐ It is the average of all points above the line
- ☐ It is the average error of all points

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Write A, B, or C here (you can choose more than one answer if there is): __ A & C

Compute the **mean absolute error** for the following line and points:

- line: $y = 1.2x + 2$
- points: (2, -2), (5, 6), (-4, -4), (-7, 1), (8, 14)

Enter your response here: __ MAE = (y - y_pred) / len

$| -2 - 4.4 | = 6.4 \text{ — } | 6 - 8 | = 2 \text{ — } | -4 + 2.8 | = 1.2 \text{ — } | 1 + 6.4 | = 7.4 \text{ — } | 14 - 11.6 | = 2.4$

$\text{MAE} = (6.4 + 2 + 1.2 + 7.4 + 2.4) / 5 = 3.88$

Quiz for Mean Squared Error

Compute the **mean squared error** for the following line and points:

- line: $y = 1.2x + 2$
- points: (2, -2), (5, 6), (-4, -4), (-7, 1), (8, 14)

Enter your response here: __ **MSE = (40.96+4+1.44+54.76+5.76) / 5 = 21.38**

Quiz Question

There are 2 major ways to fit a line in machine learning. Which of the following are ways to fit a line?

- ☐ Minimize the error function using mean-squared or mean-absolute
- ☐ Try every possible position and slope of the line by hand until you get it right
- ☐ Using any of the tricks such as the absolute and the square trick

Write A, B, or C here (you can choose more than one answer if there is): __ **A & C**

Quiz Question

Which of the following could be possible new dimensions for the house price dataset

- ☐ Number of bedrooms
- ☐ Age of house
- ☐ Opinions of neighbors
- ☐ Distance to shopping
- ☐ Types of restaurants nearby

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Write A, B, C, D, or E here (you can choose more than one answer if there is): __ **A & B & D & E**