Quiz M4.01

Note: For each question **make sure you select all of the correct options—** there may be more than one! Don't forget to use the sandbox notebook if you need.

Question 1 (1/1 point)

What is a linear regression?

- ○ a) a model that outputs a continuous prediction as the sum of the values of a **limited** subset of the input features
- ○ b) a model that outputs a binary prediction based on a linear combination of the values of the input features
- ◉ c) a model that output a continuous prediction as a weighted sum of the input features ✔

EXPLANATION

solution: c)

A linear regression model combines the values of the input features (with an additional intercept) using a weighted sum with automatically adjusted weights to predict the value of a continuous target variable.

You have used 1 of 1 submissions

Question 2 (1/1 point)

a) yes

b) no ✔

EXPLANATION

solution: b)

By definition, in a non-linearly separable dataset, the points of different classes cannot be separated by a single straight line (or an hyperplane which is the generalization of a straight line for higher dimensional problems).

The decision boundary of a linear classifier by itself is always a hyperplane.

Therefore it is not possible to get zero training error with a linear classifier such as logistic regression on a non-linearly separable dataset.

In a future section, we will se how non-linearities can be expressed by linear models when used along with feature engineering, and therefore reducing the prediction error on the training set.

You have used 1 of 1 submissions

Question 3 (1/1 point)

If we fit a linear regression where `x` is a single column vector, how many parameters our model will be made of?

a) 1

b) 2 ✔

EXPLANATION

Solution: b)

The model is of the form `a * x + b` where x is a number (i.e. the value of the single feature). The parameters are `a` (called the slope) and `b` (called the intercept).

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Question 4 (1/1 point)

If we train a scikit-learn `LinearRegression` with `X` being a single column vector and `y` a vector, `coef_` and `intercept_` will be respectively:

- a) an array of shape (1, 1) and a number
- b) an array of shape (1,) and an array of shape (1,)
- c) an array of shape (1, 1) and an array of shape (1,)
- d) an array of shape (1,) and a number ✔

EXPLANATION

Solution: d)

```
# data with two rows and a single column, i.e. two samples and a single feature
data = [[1], [2]]
target = [1, 2]

model.fit(data, target)

print(f'coef_: {model.coef_}')
print(f'coef_ shape: {model.coef_.shape}')
print(f'intercept_: {model.intercept_}')
```

You have used 1 of 1 submissions

Question 5 (1/1 point)

The decision boundaries of a logistic regression model:

- a) split classes using only one of the input features
- b) split classes using a combination of the input features ✔
- c) often have curved shapes

EXPLANATION

The logistic regression model is a linear model of the form `y_pred = np.dot(data, model.coef_) + model.intercept_`. Thus, this is a linear combination of all input features.

You have used 1 of 1 submissions

Question 6 (1/1 point)

- a) (10,)
- b) (10, 2) ✔
- c) (2, 10)

EXPLANATION

solution: b)

For a binary classification task, `n_classes` is 2.

You have used 1 of 1 submissions

Question 7 (1/1 point)

In logistic regression's `predict_proba` method in scikit-learn, which of the following statements is true regarding the predicted probabilities?

- a) The sum of probabilities across different classes for a given sample is always equal to 1.0. ✔
- b) The sum of probabilities across all samples for a given class is always equal to 1.0.
- c) The sum of probabilities across all features for a given class is always equal to 1.0.

EXPLANATION

solution: a)

You have used 1 of 1 submissions

YOUR EXPERIENCE

According to you, this whole 'Intuitions on linear models' lesson was:

- ○ **Too easy, I got bored**
- ○ **Adapted to my skills**
- ○ **Difficult but I was able to follow**
- ○ **Too difficult**

Submit

To follow this lesson, I spent:

- ○ **less than 30 minutes**
- ○ **30 min to 1 hour**
- ○ **1 to 2 hours**
- ○ **2 to 4 hours**
- ○ **more than 4 hours**
- ○ **I don't know**

Submit

FORUM (EXTERNAL RESOURCE)

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