

Homework Week 4

Part 1 - Preprocessing Data

- 1) Consider the following table of Grades you would like to convert these values to features using one-hot encoding

Student/Sample	Value
0	A
1	B
2	A
3	C
4	D

Select the correct output after one-hot encoding:

a)

Sample	Value
0	0
1	1
2	0
3	1
4	0

b)

Sample	A	B	C	D
0	1	0	0	0
1	0	1	0	0
2	1	0	0	0
3	0	0	1	0
4	0	0	0	1

c)

Sample	Value
0	5
1	4
2	5
3	1
4	0

- 2) The following exam is out of 100 what is the result if you apply feature binarization such that if the student passes convert the feature to 1 else 0

Student/Sample	EXAM
0	51
1	66
2	10
3	90
6	44

a)

Student/Sample	EXAM
0	1
1	1
2	0
3	1
6	0

b)

Student/Sample	EXAM
0	0
1	0
2	1
3	0
6	1

b)

Student/Sample	EXAM
0	1
1	0
2	1
3	0
6	1

d)

Student/Sample	EXAM
0	50
1	70
2	0
3	100
6	60

- 3) Consider the two tables i and ii, you would like to use them combating them to use them as a feature to train a model is Sk-learn

i)

Student/Sample	EXAM
0	1
1	1
2	0
3	1
6	0

ii)

Sample	A	B	C	D
0	1	0	0	0
1	0	1	0	0
2	1	0	0	0
3	0	0	1	0
4	0	0	0	1

What is the correct set of features be

a) X=

1	0	0	0
0	1	0	0
1	0	0	0
0	0	1	0
0	0	0	1

b) X=

1	0	0	0	1
0	1	0	0	1
1	0	0	0	0
0	0	1	0	1
0	0	0	1	0

c) X=

1	0	0	0	1
0	1	0	0	1
1	0	0	0	0
0	0	1	0	1
0	0	0	1	0
1	1	0	0	1

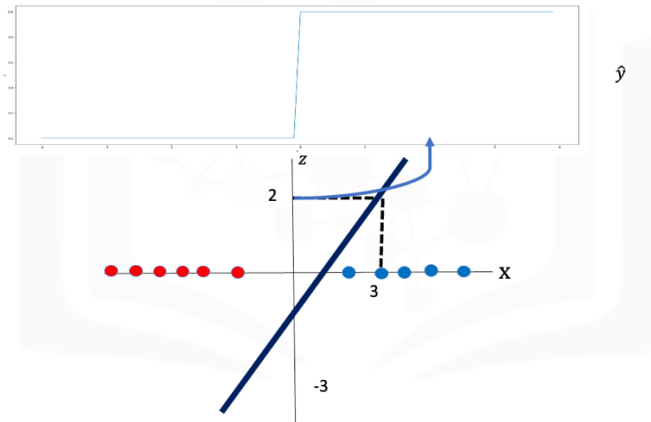
Part 2 Logistic Regression

4) What is the range of the logistic function?

A. Can take on all values

- B. Between -1 and 1
- C. Between 0 and 1
- D. Can only take on positive values

Consider the following diagram of a linear classifier. A linear function is applied $x = 3$ with the output is $z = 2$ then the threshold function is applied to z , to get the class \hat{y} .



5) What is the value of \hat{y} ?

- A. $\hat{y} = 0$
- B. $\hat{y} = 1$
- C. $\hat{y} = 2$

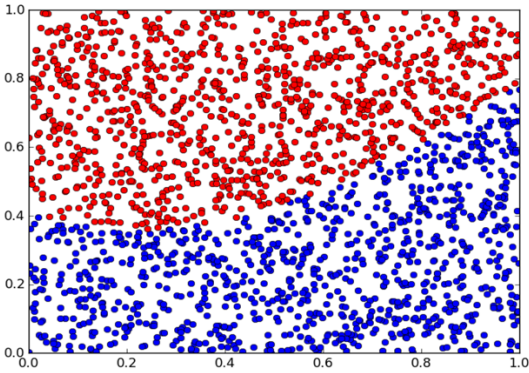
6) What would the classifier classify the red samples as

- A. $\hat{y} = 0$
- B. $\hat{y} = 1$
- C. $\hat{y} = 2$

7) In the module [sklearn.linear_model.LogisticRegression](#) what does the parameter C do

- A. Nothing
- B. Tolerance for stopping criteria.
- C. class_weightdict or 'balanced',
- D. inverse of regularization strength; must be a positive float. Like in support vector machines, smaller values specify stronger regularization.

You will need the image for the next few questions



- 8) Is the above dataset linearly separable
- A. Yes
 - B. No
- 9) What method would you use to classify the data
- A. Support vector machines (SVM)
 - B. Logistic Regression
 - C. Linear Regression
 - D. Ridge Regression

Part 3 Support vector machines (SVM)

- 10) What is the **exact** mechanism that SVM use to use a linear classifier to classifier data that is not linearly separable
- A. Polynomial transform
 - B. Multiple dimensions
 - C. multiple input
 - D. Kernel
- 11) How many Parameters did we discuss for SVM using the RBF kernel
- 12) Support vector machines find the best line to classify the data using
- A. The kernel
 - B. The margin
 - C. Soft max
 - D.

Solutions

- 1. B
- 2. A
- 3. B

4. C
5. B
6. A
7. D
8. C
9. A
10. A
11. 2
12. B