Quiz 4

Started: Oct 28 at 9:20pm

Quiz Instructions

Question 1 — 1 pts

Consider a multi-class classification problem with 10 classes and 14 features. We will use linear models $w^T x + b$ (e.g. logistic regression) as a binary classifier. What will be the total number of parameters for using ***one-vs-one*** strategies for classification?

- ○ 250
- ○ 150
- ◉ 675
- ○ 1260

Question 2 — 1 pts

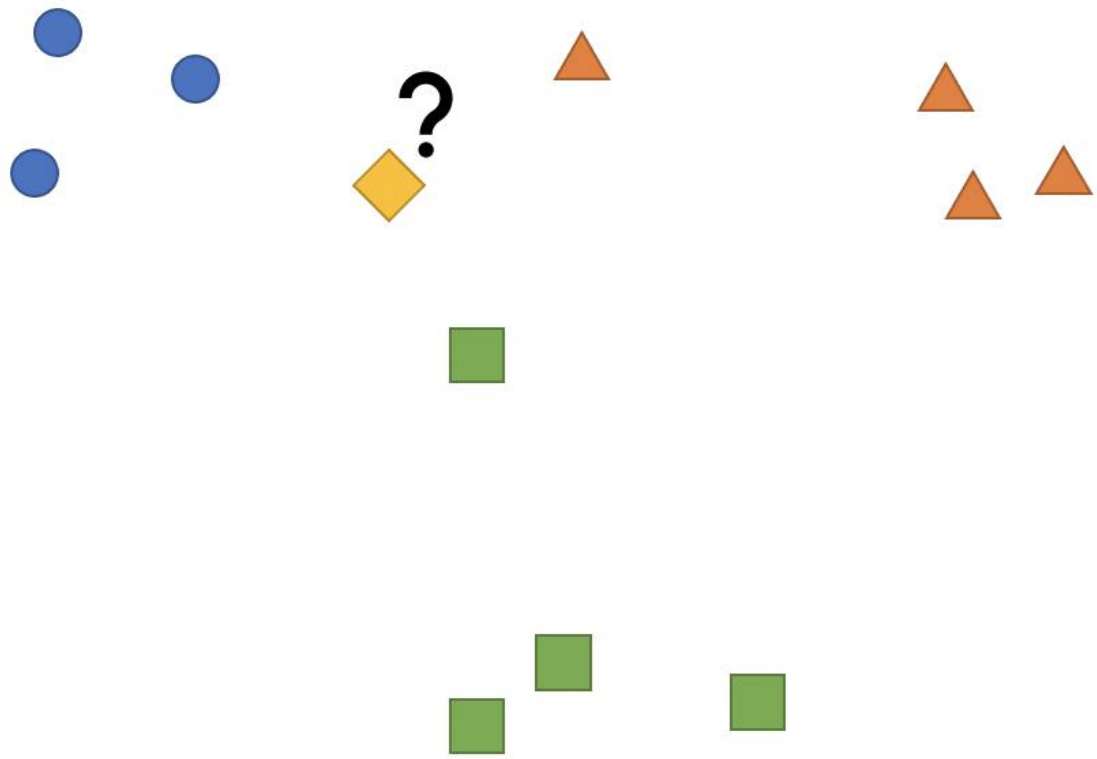
Consider a multi-class classification problem with 10 classes and 14 features. We will use linear models $w^T x + b$ (e.g. logistic regression) as a binary classifier. What will be the total number of parameters for using ***one-against-all*** strategies for classification?

- ○ 1260
- ○ 200
- ○ 675
- ◉ 150

Question 3

1 pts

Consider a multi-class classification problem with 3 classes. The distribution of the points is shown in the figure (Blue - Class 1, Orange - Class 2, Green - Class 3). We are using a 3-NN (KNN) algorithm as the binary classifier. Suppose we have a new test point (shown in Yellow). When there is no clear winner, we output "None" as the answer. What would be the predictions by one-vs-one and one-vs-all strategies for this point?



- ○ One-vs-one: Blue and One-vs-all: Blue
- ◉ One-vs-one: Blue and One-vs-all: None
- ○ One-vs-one: None and One-vs-all: None
- ○ One-vs-one: None and One-vs-all: Blue

Question 4

1 pts

Which of the following statement(s) are true about the PAC-learnability of the monotone conjunction class?

- [x] If we expect to get a function with lower error rate, we need more training samples.
- [x] If we expect to get a good function with higher probability, we need more training samples.
- [x] If the dimension of the inputs is higher (i.e., more variables), we need more training samples.
- [ ] If there are more test samples, to achieve the same error rate, we need more training samples.

Question 5

1 pts

In the lecture, we analyze monotone conjunction class. In the following, we consider learning a 5-variable ***monotone disjunction*** function (e.g., $f = x_1 \vee x_2 \vee x_3$, $f = x_3 \vee x_5$, etc) from the following data.

x_1	x_2	x_3	x_4	x_5	y
1	0	0	0	1	0
0	1	1	1	0	1
0	1	0	1	0	1

The data is generated by the target monotone disjunction function f^*. Which of the following statement(s) are true:

- [x] There are in total 32 monotone disjunction functions in the 5-variable disjunction function class.

- [x] Based on the data, x_1 cannot be part of the target monotone disjunction function f*
- [ ] Based on the data, x_1 may or may not be part of the target monotone disjunction function f*
- [x] Based on the data, x_2 may or may not be part of the target monotone disjunction function f*
- [ ] Based on the data, x_2 must be part of the target monotone disjunction function f*

Quiz saved at 9:32pm Submit Quiz