Machine Learning System Design

Quiz, 5 questions

1 point You are working on a spam classification system using regularized logistic regression. "Spam" is a positive class (y = 1) and "not spam" is the negative class (y = 0). You have trained your classifier and there are m = 1000 examples in the cross-validation set. The chart of predicted class vs. actual class is:

	Actual Class: 1	Actual Class: 0
Predicted Class: 1	85	890
Predicted Class: 0	15	10

For reference:

- Accuracy = (true positives + true negatives) / (total examples)
- Precision = (true positives) / (true positives + false positives)
- Recall = (true positives) / (true positives + false negatives)
- F_1 score = (2 * precision * recall) / (precision + recall)

What is the classifier's precision (as a value from 0 to 1)?

Enter your answer in the box below. If necessary, provide at least two values after the decimal point.

0.09

1 point 2. Suppose a massive dataset is available for training a learning algorithm. Training on a lot of data is likely to give good performance when two of the following conditions hold true.

Which are the two?

When we are willing to include high						
order polynomial features of x (such as x_1^2 , x_2^2 ,						
x_1x_2 , etc.).						

A human expert on the application domain

can confidently predict \boldsymbol{y} when given only the features \boldsymbol{x}

(or more generally, if we have some way to be confident

that \boldsymbol{x} contains sufficient information to predict \boldsymbol{y}

accurately).

	The o	classes	are	not	too	skew	ed.
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Our learning algorithm is able to

represent fairly complex functions (for example, if we

train a neural network or other model with a large

number of parameters).

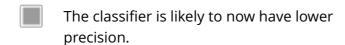
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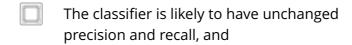
3. Suppose you have trained a logistic regression classifier which is outputing $h_{\theta}(x)$.

Currently, you predict 1 if $h_{\theta}(x) \geq \text{threshold}$, and predict 0 if $h_{\theta}(x) < \text{threshold}$, where currently the threshold is set to 0.5.

Suppose you **decrease** the threshold to 0.1. Which of the following are true? Check all that apply.

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thus the same F_1 score.

The classifier is likely to have unchanged precision and recall, but

higher accuracy.

1 point 4. Suppose you are working on a spam classifier, where spam

emails are positive examples (y=1) and non-spam emails are

negative examples (y=0). You have a training set of emails

in which 99% of the emails are non-spam and the other 1% is

spam. Which of the following statements are true? Check all

that apply.



If you always predict non-spam (output

y=0), your classifier will have an accuracy of

If you always predict spam (output $y=1$),
your classifier will have a recall of 100% and precision
of 1%.
If you always predict non-spam (output
y=0), your classifier will have a recall of
0%.
If you always predict spam (output $y=1$),
your classifier will have a recall of 0% and precision
of 99%.

1 point Which of the following statements are true? Check all that apply.

training set, then obtaining more data is likely to
help.

It is a good idea to spend a lot of time
collecting a large amount of data before building
your first version of a learning algorithm.

After training a logistic regression

classifier, you **must** use 0.5 as your threshold

for predicting whether an example is positive

or





Using a **very large** training set

makes it unlikely for model to overfit the training

data.



The "error analysis" process of manually

examining the examples which your algorithm got wrong

can help suggest what are good steps to take (e.g.,

developing new features) to improve your algorithm's

performance.



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