

✓ Congratulations! You passed!

Next Item



1/1 point

1

Problem Statement

This example is adapted from a real production application, but with details disguised to protect confidentiality.





You are a famous researcher in the City of Peacetopia. The people of Peacetopia have a common characteristic: they are afraid of birds. To save them, you have **to build an algorithm that will detect any bird flying over Peacetopia** and alert the population.

The City Council gives you a dataset of 10,000,000 images of the sky above Peacetopia, taken from the city's security cameras. They are labelled:

- y = 0: There is no bird on the image
- y = 1: There is a bird on the image

Your goal is to build an algorithm able to classify new images taken by security cameras from Peacetopia.

There are a lot of decisions to make:

- What is the evaluation metric?
- How do you structure your data into train/dev/test sets?

Metric of success

The City Council tells you that they want an algorithm that

- 1. Has high accuracy
- 2. Runs quickly and takes only a short time to classify a new image.
- 3. Can fit in a small amount of memory, so that it can run in a small processor that the city will attach to many different security cameras.

Note Having Pitederagogniting inchesity of your color of the speed with which your testing the speed with the spee
True
Correct
False
1/1

2.

point

After further discussions, the city narrows down its criteria to:

- "We need an algorithm that can let us know a bird is flying over Peacetopia as accurately as possible."
- "We want the trained model to take no more than 10sec to classify a new image."
- "We want the model to fit in 10MB of memory."

If you had the three following models, which one would you choose?

	Test Accuracy	Runtime	Memory size
	97%	1 sec	3MB
	Test Accuracy	Runtime	Memory size
	99%	13 sec	9MB
_			
	Test Accuracy	Runtime	Memory size

←	Bird recognition in the city of Peacetopia (case study) Quiz, 15 questions		2MB
0	Test Accuracy	Runtime	Memory size
	98%	9 sec	9MB

Correct

Correct! As soon as the runtime is less than 10 seconds you're good. So, you may simply maximize the test accuracy after you made sure the runtime is <10sec.



1/1 point

3.

Based on the city's requests, which of the following would you say is true?

Accuracy is an optimizing metric; running time and memory size are a satisficing metrics.

Correct

- Accuracy is a satisficing metric; running time and memory size are an optimizing metric.
- Accuracy, running time and memory size are all optimizing metrics because you want to do well on all three.
- Accuracy, running time and memory size are all satisficing metrics because you have to do sufficiently well on all three for your system to be acceptable.



1/1 point

Bird recognition in the city of Peacetopia (case study) **Structuring your data**

Before implementing your algorithm, you need to split your data into train/dev/test sets. Which of these do you think is the best choice?

Train	Dev	Test
3,333,334	3,333,333	3,333,333

Train	Dev	Test
6,000,000	3,000,000	1,000,000

Train	Dev	Test
6,000,000	1,000,000	3,000,000

0	Train	Dev	Test
	9,500,000	250,000	250,000

Correct

Yes.



1/1 point

5.

After setting up your train/dev/test sets, the City Council comes across another 1,000,000 images, called the "citizens' data". Apparently the citizens of Peacetopia it do sea of the pito sea of the citizens of Peacetopia it do sea of the citizens of the

	ould not add the citizens' data to the training set, because this will cause the training and dev/test set distributions to become different, thus g dev and test set performance. True/False?
	True
0	False
	ect ing this data to the training set will change the training set distribution. However, it is not a problem to have different training and dev ribution. On the contrary, it would be very problematic to have different dev and test set distributions.
~	1/1 point
	ember of the City Council knows a little about machine learning, and thinks you should add the 1,000,000 citizens' data images to the test u object because:
	The test set no longer reflects the distribution of data (security cameras) you most care about.
Corr	ect
	This would cause the dev and test set distributions to become different. This is a bad idea because you're not aiming where you want to hit.
Corr	ect

outstand massing respect to the position of	
The 1,000,000 citizens' data images do not have aconsistent x->y mapping as the rest of the data (similar to the New York City/Detroit housing prices example from lecture). Quiz, 15 questions	
Un-selected is correct	
A bigger test set will slow down the speed of iterating because of the computational expense of evaluating models on the test set.	
Un-selected is correct	



1/1 point

7

You train a system, and its errors are as follows (error = 100%-Accuracy):

Training set error	4.0%
Dev set error	4.5%

This suggests that one good avenue for improving performance is to train a bigger network so as to drive down the 4.0% training error. Do you agree?

	Yes, because having 4.0% training error shows you have high bias
	Yes, because this shows your bias is higher than your variance.
	No, because this shows your variance is higher than your bias.
0	No, because there is insufficient information to tell.

Correct



Bird recognition in the city of Peacetopia (case study)

Quiz, 15 questions



1/1 point

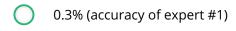
8.

You ask a few people to label the dataset so as to find out what is human-level performance. You find the following levels of accuracy:

Bird watching expert #1	0.3% error
Bird watching expert #2	0.5% error
Normal person #1 (not a bird watching expert)	1.0% error
Normal person #2 (not a bird watching expert)	1.2% error

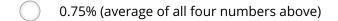
If your goal is to have "human-level performance" be a proxy (or estimate) for Bayes error, how would you define "human-level performance"?

()	0.0% (because it is impossible to do better than this



Correct

0.4% (a	verage	of 0.3	and	0.5)
0.170 (0	11000	0.0.5	aria	0.5

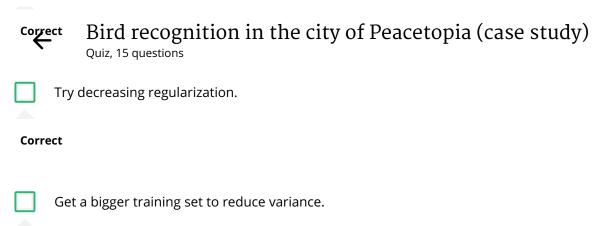




1/1 point

9.

Which of the following statements do you agree with? Bird recognition in the city of Peacetopia (case study) A lea মিনাৰ প্রাক্তি performance can be better than human-level performance but it can never be better than Bayes error. Correct		
A learning algorithm's performance can never be better than human-level performance but it can be be	etter than Bayes error.	
A learning algorithm's performance can never be better than human-level performance nor better than	Bayes error.	
A learning algorithm's performance can be better than human-level performance and better than Bayes error.		
1/1 point 10. You find that a team of ornithologists debating and discussing an image gets an even better 0.1% performance, performance." After working further on your algorithm, you end up with the following:	, so you define that as "human-level	
Human-level performance	0.1%	
Training set error	2.0%	
Dev set error	2.1%	
Based on the evidence you have, which two of the following four options seem the most promising to try? (Chec Try increasing regularization. Un-selected is correct	ck two options.)	
Train a bigger model to try to do better on the training set.		



Un-selected is correct



1/1 point

11.

You also evaluate your model on the test set, and find the following:

Human-level performance	0.1%
Training set error	2.0%
Dev set error	2.1%
Test set error	7.0%

What does this mean? (Check the two best options.)

You should get a bigger test set.

Un-selected is correct

You have underfit to the dev set. Bird recognition in the city of Peacetopia (case study) Quiz, 15 questions Un-selected is correct
You have overfit to the dev set.
Correct
You should try to get a bigger dev set. Correct
Correct



1/1 point

12.

After working on this project for a year, you finally achieve:

Human-level performance	0.10%
Training set error	0.05%
Dev set error	0.05%

What can you conclude? (Check all that apply.)

With only 0.09% further progress to make, you should quickly be able to close the remaining gap to 0%

Un-selected is correct

This is a statistical anomaly (or must be the result of statistical noise) since it should not be possible to surpass human-level performance. Quiz, 15 questions
Un-selected is correct
It is now harder to measure avoidable bias, thus progress will be slower going forward.
Correct
If the test set is big enough for the 0.05% error estimate to be accurate, this implies Bayes error is ≤ 0.05
Correct
1/1 point

13.

It turns out Peacetopia has hired one of your competitors to build a system as well. Your system and your competitor both deliver systems with about the same running time and memory size. However, your system has higher accuracy! However, when Peacetopia tries out your and your competitor's systems, they conclude they actually like your competitor's system better, because even though you have higher overall accuracy, you have more false negatives (failing to raise an alarm when a bird is in the air). What should you do?

	Look at all the models you've developed during the development process and find the one with the lowest false negative error rate.
	Ask your team to take into account both accuracy and false negative rate during development.
0	Rethink the appropriate metric for this task, and ask your team to tune to the new metric.

Correct



Pick false pegative rate as the new metric and use this new metric to drive all further development. Pick false pegative rate as the new metric and use this new metric to drive all further development.

Quiz, 15 questions



1/1 point

14.

You've handily beaten your competitor, and your system is now deployed in Peacetopia and is protecting the citizens from birds! But over the last few months, a new species of bird has been slowly migrating into the area, so the performance of your system slowly degrades because your data is being tested on a new type of data.



You have only 1,000 images of the new species of bird. The city expects a better system from you within the next 3 months. Which of these should you do first?



Correct

Use the data you have to define a new evaluation metric (using a new dev/test set) taking into account the new species, and use that to drive Bittle (general parties) Quiz, 15 questions
Correct
Put the 1,000 images into the training set so as to try to do better on these birds.
Try data augmentation/data synthesis to get more images of the new type of bird.
Add the 1,000 images into your dataset and reshuffle into a new train/dev/test split.
1/1 point 15. The City Council thinks that having more Cats in the city would help scare off birds. They are so happy with your work on the Bird detector that the also hire you to build a Cat detector. (Wow Cat detectors are just incredibly useful aren't they.) Because of years of working on Cat detectors, you have such a huge dataset of 100,000,000 cat images that training on this data takes about two weeks. Which of the statements do you agree with (Check all that agree.)
Having built a good Bird detector, you should be able to take the same model and hyperparameters and just apply it to the Cat dataset, so there is no need to iterate.
Un-selected is correct
If 100,000,000 examples is enough to build a good enough Cat detector, you might be better of training with just 10,000,000 examples to gain a \approx 10x improvement in how quickly you can run experiments, even if each model performs a bit worse because it's trained on less data.

https://www.coursera.org/learn/machine-learning-projects/exam/TcWkR/bird-recognition-in-the-city-of-peacetopia-case-study

	ding two weeks to train will limit the speed at which you can iterate. Bird recognition in the city of Peacetopia (case study) Quiz, 15 questions
Buyir Correct	ng faster computers could speed up your teams' iteration speed and thus your team's productivity.





