Feedback — XVIII. Application: Photo OCR

Help Center

You submitted this quiz on **Mon 13 Apr 2015 10:00 PM CEST**. You got a score of **5.00** out of **5.00**.

Question 1

Suppose you are running a sliding window detector to find text in images. Your input images are 1000x1000 pixels. You will run your sliding windows detector at two scales, 10x10 and 20x20 (i.e., you will run your classifier on lots of 10x10 patches to decide if they contain text or not; and also on lots of 20x20 patches), and you will "step" your detector by 2 pixels each time. About how many times will you end up running your classifier on a single 1000x1000 test set image?

Your Answer		Score	Explanation
(•) 500,000	✔	1.00	With a stride of 2, you will run your classifier approximately 500 times for each dimension. Since you run the classifier twice (at two scales), you will run it 2 * 500 * 500 = 500,000 times.
( ) 1,000,000			
( ) 100,000			
( ) 250,000			
Total		1.00 / 1.00	

Question 2

Suppose that you just joined a product team that has been developing a machine learning application, using $m = 1,000$ training examples. You discover that you have the option of hiring additional personnel to help collect and label data. You estimate that you would have to pay each of the labellers $10 per hour, and that each labeller can label 4 examples per minute. About how

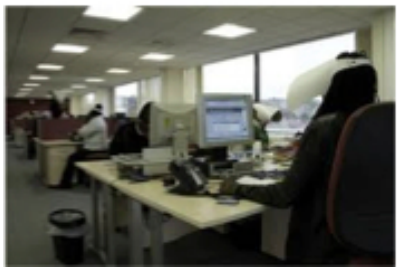
much will it cost to hire labellers to label 10,000 new training examples?

Your Answer		Score	Explanation
$600			
$10,000			
$250			
$400	✔	1.00	On labeller can label $4 \times 60 = 240$ examples in one hour. It will thus take him $10,000/240 \approx 40$ hours to complete 10,000 examples. At $10 an hour, this is $400.
Total		1.00 / 1.00	

Question 3

Suppose you are building an object classifier, that takes as input an image, and recognizes that image as either containing a car ($y = 1$) or not ($y = 0$). For example, here are a positive example and a negative example:

Positive example ($y = 1$)



Negative example ($y = 0$)

After carefully analyzing the performance of your algorithm, you conclude that you need more

positive ($y = 1$) training examples. Which of the following might be a good way to get additional positive examples?

Your Answer		Score	Explanation
Make two copies of each image in the training set; this immediately doubles your training set size.			
Take a training example and set a random subset of its pixel to 0 to generate a new example.			
Apply translations, distortions, and rotations to the images already in your training set.	✔	1.00	These geometric distortions are likely to occur in real-world images, so they are a good way to generate additional data.
Select two car images and average them to make a third example.			
Total		1.00 / 1.00	

Question 4

Suppose you have a PhotoOCR system, where you have the following pipeline:

You have decided to perform a ceiling analysis on this system, and find the following:

Component	Accuracy
Overall System	70%
Text Detection	72%
Character Segmentation	82%
Character Recognition	100%

Which of the following statements are true?

Your Answer	Score	Explanation

☐ The least promising component to work on is the character recognition system, since it is already obtaining 100% accuracy.	✔	0.25	The character recognition component is the most promising, as ground truth character recognition improves performance by 18% over feeding the current character recognition system ground truth character segmentation.
☐ We should dedicate significant effort to collecting additional training data for the text detection system.	✔	0.25	A perfect text detection system improves overall performance by only 2%, so collecting additional data for that system is not a good investment of time.
☑ If we conclude that the character recognition's errors are mostly due to the character recognition system having high variance, then it may be worth significant effort obtaining additional training data for character recognition.	✔	0.25	Since the biggest improvement comes from character recognition ground truth, we would like to improve the performance of that system. It the character recognition system has high variance, additional data will improve its performance.
☑ Performing the ceiling analysis shown here requires that we have ground-truth labels for the text detection, character segmentation and the character recognition systems.	✔	0.25	At each step, we provide the system with the ground-truth output of the previous step in the pipeline. This requires ground truth for every step of the pipeline.
Total		1.00 / 1.00	

Question 5

What are the benefits of performing a ceiling analysis? Check all that apply.

Your Answer		Score	Explanation
☑ It helps us decide on allocation of resources in terms of which component in a machine learning pipeline to spend more effort on.	✔	0.25	The ceiling analysis reveals which parts of the pipeline have the most room to improve the performance of the overall system.
☐ A ceiling analysis helps us to decide what is the most promising learning algorithm (e.g., logistic regression vs. a neural network vs. an SVM) to apply to a specific component of a machine learning pipeline.	✔	0.25	A ceiling analysis works with different components of a pipeline under a fixed algorithm setup.
☐ It is a way of providing additional training data to the algorithm.	✔	0.25	Ceiling analysis works with the data already present.
☑ It can help indicate that certain components of a system might not be worth a significant amount of work improving, because even if it had perfect performance its impact on the overall system may be small.	✔	0.25	An unpromising component will have little effect on overall performance when it is replaced with ground truth.
Total		1.00 / 1.00	