

Feedback — XVIII. Application: Photo OCR

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You submitted this quiz on **Sat 4 Jan 2014 9:26 PM PST**. 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
<input type="radio"/> 100,000		
<input type="radio"/> 250,000		
<input checked="" type="radio"/> 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.
<input type="radio"/> 1,000,000		
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
<input type="radio"/> \$250		
<input type="radio"/> \$10,000		
<input checked="" type="radio"/> \$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.
<input type="radio"/> \$600		
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 ($y = 1$)

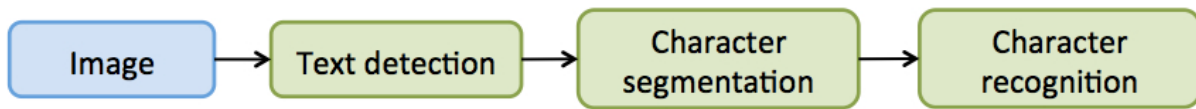
Negative example ($y = 0$)

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
<input type="radio"/> Take a training example and set a random subset of its pixel to 0 to generate a new example.		
<input checked="" type="radio"/> 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.
<input type="radio"/> Select two car images and average them to make a third example.		
<input type="radio"/> Make two copies of each image in the training set; this immediately doubles your training set size.		
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
<input checked="" type="checkbox"/> There is a large gain in performance possible in improving the character recognition system.	✓ 0.25	Plugging in ground truth character recognition gives an 18% improvement over running the character recognition system on ground truth character segmentation. Thus there is a good deal of room for overall improvement by improving character recognition.
<input type="checkbox"/> 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.
<input type="checkbox"/> 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.
<input checked="" type="checkbox"/> If we conclude that the character	✓ 0.25	Since the biggest improvement comes from character recognition ground truth, we would like to improve the

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.

performance of that system. If the character recognition system has high variance, additional data will improve its performance.

Total	1.00 /
	1.00

Question 5

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

Your Answer	Score	Explanation
<input type="checkbox"/> It is a way of providing additional training data to the algorithm.	✓ 0.25	Ceiling analysis works with the data already present.
<input checked="" type="checkbox"/> It gives us information about which components, if improved, are most likely to have a significant impact on the performance of the final system.	✓ 0.25	The ceiling analysis gives us this information by comparing the baseline overall system performance with ground truth results from each component of the pipeline.
<input checked="" type="checkbox"/> 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	✓ 0.25	An unpromising component will have little effect on overall performance when it is replaced with ground truth.

the overall system may be small.

<input type="checkbox"/> 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.
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Total	1.00 /
	1.00