Feedback — XVIII. Application: Photo OCR

Help

You submitted this quiz on **Sat 4 Jan 2014 9:12 PM PST**. You got a score of **3.50** out of **5.00**. You can attempt again in 10 minutes.

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
100,000			
500,000			
1,000,000			
250,000	✖	0.00	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.
Total		0.00 / 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
$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.
$600			
$10,000			
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
Take a few images from your training set, and add random, gaussian noise to every pixel.			
Mirror your training images across the vertical axis (so that a left-facing car now becomes a right-facing one).	✔	1.00	A mirrored example is different from the original but equally likely to occur, so mirroring is a good way to generate new data.
Take a training example and set a random subset of its pixel to 0 to generate a new example.			
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
☑ 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.
☑ The least promising component to work on is the character recognition system, since it is already obtaining 100% accuracy.	✖	0.00	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.
☑ Performing the ceiling analysis shown here requires that we	✔	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.

have ground-truth labels for the text detection, character segmentation and the character recognition systems.			
☑ The most promising component to work on is the text detection system, since it has the lowest performance (72%) and thus the biggest potential gain.	✖	0.00	Text detection is the least promising component, as ground truth text detection improves overall system performance by only 2% over the baseline.
Total		0.50 / 1.00	

Question 5

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

Your Answer		Score	Explanation
☑ 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.
☑ 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.

☐ It is a way of providing additional training data to the algorithm.	✔	0.25	Ceiling analysis works with the data already present.
☐ 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.
Total		1.00 / 1.00	