◎ 축하합니다! 통과하셨습니다!

받은 학점 100% **최신 제출물 학점** 100% **통과 점수**: 80% 이상

다음 mm 후에 과제 - 항목 시 풀어보세요. 으로 이동

1. To help you practice strategies for machine learning, this week we'll present another scenario and ask how you 1/1점 would act. We think this "simulator" of working in a machine learning project will give an idea of what leading a machine learning project could be like! You are employed by a startup building self-driving cars. You are in charge of detecting road signs (stop sign, pedestrian crossing sign, construction ahead sign) and traffic signals (red and green lights) in images. The goal is to recognize which of these objects appear in each image. As an example, this image contains a pedestrian crossing sign and red traffic lights. $y^{(l)} = \begin{bmatrix} 0 \\ 1 \end{bmatrix} \text{"stop sign"} \\ 0 \text{"construction ahead sign"} \\ 1 \end{bmatrix} \text{"red traffic light"}$ 0 green traffic light" Your 100,000 labeled images are taken using the front-facing camera of your car. This is also the distribution of data you care most about doing well on. You think you might be able to get a much larger dataset off the internet, which could be helpful for training even if the distribution of internet data is not the same. You are getting started with this project. What is the first thing you do? Assume each of the steps below would take about an equal amount of time (a few days). Invest a few days in thinking on potential difficulties, and then some more days brainstorming about possible solutions, before training any model. Spend some time searching the internet for the data most similar to the conditions you expect on production. Spend a few days collecting more data using the front-facing camera of your car, to better understand how much data per unit time you can collect. ∠ 전보기 Applied ML is highly iterative. Having a basic model to do an error analysis can point you in the most promising directions with a lot of certainties. Your goal is to detect road signs (stop sign, pedestrian crossing sign, construction ahead sign) and traffic signals (red and green lights) in images. The goal is to recognize which of these objects appear in each image. You plan to use a deep neural network with feel units in the hidden layers. For the output layer, which for the following gives 1/1점 you the most appropriate activation function? ○ ReLU Linear Sigmoid ∠ 전보기 ♡ 맞습니다 Correct. This works well since the output would be valued between 0 and 1 which represents the probability that one of the possibilities is present in an image. 3. You are carrying out error analysis and counting up what errors the algorithm makes. Which of these datasets do you think you should manually go through and carefully examine, one image at a time? 500 images on which the algorithm made a mistake 0 10,000 images on which the algorithm made a mistake ∠^ 터보기 ② 맞습니다 Focus on images that the algorithm got wrong. Also, 500 is enough to give you a good initial sense of the error statistics. There's probably no need to look at 10,000, which will take a long time. 4. After working on the data for several weeks, your team ends up with the following data: 1/1점 100,000 labeled images taken using the front-facing camera of your car. 900,000 labeled images of roads downloaded from the internet. Each image's labels precisely indicate the presence of any specific road signs and traffic signals or combinations of them. For example, $y^{(i)} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$ means the image contains a stop sign and a red traffic light. ask learning problem, you need to have all your $y^{(i)}$ vectors fully labeled. If one Because this is a n then the learning algorithm will not be able to use that example. True/False? ○ True False √ 의 대보기 A seen in the lecture on multi-task learning, you can compute the cost such that it is not influenced by the fact that some entries haven't been labeled.

different distribution than the images you were able to find and download off the internet. How should you split the dataset into train/dev/test sets?Mix all the 100,000 images with the 900,000 images you found online. Shuffle everything. Split the 1,000,000 images dataset into 600,000 for the training set. 200,000 for the dev set and 200,000 for the test set. Choose the training set to be the 900,000 images from the internet along with 20,000 images from your car's front-facing camera. The 80,000 remaining images will be split equally in dev Choose the training set to be the 900,000 images from the internet along with 80,000 images
 from your car's front-facing camera. The 20,000 remaining images will be split equally in dev
 and test sets. ∠^ 더보기 ⊘ 맞습니다 र उपमध्य Yes. As seen in the lecture, it is important that your dev and test set have the closest possible distribution to "real" data. It is also important for the training set to contain enough "real" data to avoid having a data-6. Assume you've finally chosen the following split between the data: 1/1점 Dataset: Contains: algorithm: 940,000 images randomly picked from (900,000 internet images + 60,000 car's front-facing camera images) 1% 20,000 images randomly picked from (900,000 internet images + 60,000 car's front-facing camera images) 5.1% Dev 20,000 images from your car's front-facing camera 5 696 Test 20,000 images from the car's front-facing camera 6.8% You also know that human-level error on the road sign and traffic signals classification task is around 0.5%. Which of the following is true? You have a high bias. You have a large data-mismatch problem. The size of the train-dev set is too high. ₹ 터보기 ② 탓습니다 Correct. Since the difference between the training-dev error and the training error is high. 7. Assume you've finally chosen the following split between the data: 1/1점 Error of the Dataset: Contains: algorithm 940,000 images randomly picked from (900,000 internet images + 60,000 car's front-facing camera images) 8.8% Training 20,000 images randomly picked from (900,000 internet images + 60,000 car's front-facing camera images) Training-Dev 20,000 images from your car's front-facing camera Test 20,000 images from the car's front-facing camera 14.8% You also know that human-level error on the road sign and traffic signals classification task is around 0.5%. Based on the information given, a friend thinks that the training data distribution is much easier than the dev/test distribution. What do you think? Your friend is right. (Le., Bayes error for the training data distribution is probably lower than for the dev/test distribution.) Your friend is wrong. (I.e., Bayes error for the training data distribution is probably higher than for the dev/test distribution.) There's insufficient information to tell if your friend is right or wrong. ∠ 전보기 ⊘ 맞습니다 ਲਵਾਮ The algorithm does better on the distribution of data it trained on. But you don't know if it's because it trained on that distribution or if it really is easier. To get a better sense, measure human-level error separately on both distributions. 8. You decide to focus on the deviset and check by hand what the errors are due to. Here is a table summarizing your 1/1점 Errors due to incorrectly labeled data 4.196 Errors due to foggy pictures 3.0% Errors due to partially occluded elements. 7.2% Errors due to other causes In this table, 4.1%, 7.2%, etc. are a fraction of the total dev set (not just examples of your algorithm mislabeled) For example, about 7.2/15.3 = 47% of your errors are due to partially occluded elements. You shouldn't invest all your efforts to get more images with partially occluded elements since 4.1 + 3.0 + 1.0 = 8.1 > 7.2. True/False? False ○ True

 You decide to focus on the dev set and check by hand what the errors are due to. Here is a table summarizing your discoveries:

Correct. These kinds of arguments don't help us to decide on the strategy to follow. Other factors should be used, such as the tradeoff between the cost of getting new images and the improvement of the system

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Overall dev set error	15.3%
Errors due to incorrectly labeled data	4.196
Errors due to foggy pictures	3.0%
Errors due to partially accluded elements	7.200

1/1점

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	use your model. True/False?			
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	Correct. When using transfer leadifferent from a binary classific		t is one of the aspects that is	
ave been using this approach: 1/1정	4. To recognize red and green lights, you	ı have been using this approach:		1/1점
	(A) Input an image (x) to a neur	al network and have it directly learn a n	apping to make a prediction as to	
ave been using this approach:	맞습니다 Correct. When using transfer led different from a binary classific	ation problem.	t is one of the aspects that is	
network and have it directly learn a manning to make a prediction as to	whether there's a red light and/	or green light (y).	representation as to	
	A teammate proposes a different, two			

(B) In this two-step approach, you would first (i) detect the traffic light in the image (if any), then (ii) determine the color of the illuminated lamp in the traffic light.

Between these two, Approach B is more of an end-to-end approach because it has distinct steps for the input end and the output end. True False?

