5. Now that you've set up your train/dev/test sets, the City Council comes across another 1,000,000 images from social media and offers them to you. These images are different from the distribution of images the City Council had originally given you, but you think it could help your algorithm. Which of the following is the best use of that additional data? 1 / 1 poin

- ○ Split it among train/dev/test equally.
- ○ Add it to the dev set to evaluate how well the model generalizes across a broader set.
- ○ Do not use the data. It will change the distribution of any set it is added to.
- ◉ Add it to the training set.

One member of the City Council knows a little about machine learning and thinks you should add the 1,000,000 citizens' data images proportionately to the train/dev/test sets. You object because:

- ○ The 1,000,000 citizens' data images do not have a consistent x-->y mapping as the rest of the data.
- ◉ The training set will not be as accurate because of the different distributions.
- ○ The additional data would significantly slow down training time.
- ○ If we add the images to the test set then it won't reflect the distribution of data expected in production.

Expand

⊗ **Incorrect**
No. The training process to build features is robust enough to integrate similar data.

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

- ○ The best performance of a specialist (ornithologist) or possibly a group of specialists.
- ○ The performance of the head of the City Council.
- ◉ The performance of their volunteer amateur ornithologists.
- ○ The performance of the average citizen of Peacetopia.

Expand

⊗ **Incorrect**
No. These are undoubtedly better than a random citizen but not as good as a specialist.

Which of the following best expresses how to evaluate the next steps in your project when your results for human-level performance, train, and dev set error are 0.1%, 2.0%, and 2.1% respectively?

- ○ Port the code to the target devices to evaluate if your model meets or exceeds the satisficing metrics.
- ○ Keep tuning until the train set accuracy is equal to human-level performance because it is the optimizing metric.
- ◉ Based on differences between the three levels of performance, prioritize actions to decrease bias and iterate.
- ○ Evaluate the test set to determine the magnitude of the variance.

Expand

✓ **Correct**
Yes. Always choose the area with the biggest opportunity for improvement.

.. You've now also run your model on the test set and find that it is a 7.0% error compared to a 2.1% error for the dev set. What should you do? (Choose all that apply) 1

- ☐ Try decreasing regularization for better generalization with the dev set.
- ☑ Increase the size of the dev set.

✓ **Correct**
Yes. The dev set performance versus the test set indicates it is overfitting.

- ☑ Try increasing regularization to reduce overfitting to the dev set.

✓ **Correct**
Yes. The dev set performance versus the test set indicates it is overfitting.

- ☐ Get a bigger test set to increase its accuracy.

. 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%. Which of the following are likely? (Check all that apply.)

- ☐ The model has recognized emergent features that humans cannot. (Chess and Go for example)
- ☐ This result is not possible since it should not be possible to surpass human-level performance.
- ☑ Pushing to even higher accuracy will be slow because you will not be able to easily identify sources of bias.

✓ **Correct**
Yes. Exceeding human performance means you are close to Bayes error.

- ☑ There is still avoidable bias.

! **This should not be selected**
No. Exceeding human performance makes the identification of avoidable bias very challenging.

i. Now that you've set up your train/dev/test sets, the City Council comes across another 1,000,000 images from social media and offers them to you. These images are different from the distribution of images the City Council had originally given you, but you think it could help your algorithm. You should add the citizens' data to the training set. True/False? 0

- ○ True
- ◉ False

Expand

✗ **Incorrect**
No. Adding this data to the training set will change the training set distribution. However, it is not a problem to have different training and dev distributions. In contrast, it would be very problematic to have different dev and test set distributions.

. One member of the City Council knows a little about machine learning and thinks you should add the 1,000,000 citizens' data images proportionately to the train/dev/test sets. You object because: 0

- ◉ The 1,000,000 citizens' data images do not have a consistent x-->y mapping as the rest of the data.
- ○ The additional data would significantly slow down training time.
- ○ The training set will not be as accurate because of the different distributions.
- ○ If we add the images to the test set then it won't reflect the distribution of data expected in production.

Expand

✗ **Incorrect**
No. The important issue is mixing distributions.

. 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 they also hire you to build a Cat detector. You have a huge dataset of 100,000,000 cat images. Training on this data takes about two weeks. Which of the statements do you agree with? (Check all that agree.)

- ☑ Given a significant budget for cloud GPUs, you could mitigate the training time.

✓ **Correct**
Yes. More resources will allow you to iterate faster.

- ☐ Accuracy should exceed the City Council's requirements but the project may take as long as the bird detector because of the two week training/iteration time.
- ☑ You could consider a tradeoff where you use a subset of the cat data to find reasonable performance with reasonable iteration pacing.

✓ **Correct**
Yes. This is similar to satisficing metrics where "good enough" determines the size of the data.

- [x] With the experience gained from the Bird detector you are confident to build a good Cat detector on the first try.

This should not be selected

No. Although you may have gained many insights that may reduce the number of iterations needed, a DeepLearning model requires multiple iterations when working in a new dataset.

You train a system, and the train/dev set errors are 3.5% and 4.0% respectively. You decide to try regularization to close the train/dev accuracy gap. Do you agree?

- ( ) Yes, because having a 4.0% training error shows you have a high bias.
- ( ) Yes, because this shows your bias is higher than your variance.
- (•) No, because you do not know what the human performance level is.
- ( ) No, because this shows your variance is higher than your bias.

Expand

Correct

. Which of the following best expresses how to evaluate the next steps in your project when your results for human-level performance, train, and dev set error are 0.1%, 2.0%, and 2.1% respectively?

1

- (•) Based on differences between the three levels of performance, prioritize actions to decrease bias and iterate.
- ( ) Keep tuning until the train set accuracy is equal to human-level performance because it is the optimizing metric.
- ( ) Port the code to the target devices to evaluate if your model meets or exceeds the satisficing metrics.
- ( ) Evaluate the test set to determine the magnitude of the variance.

Expand

Correct

Yes. Always choose the area with the biggest opportunity for improvement.

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

- ( ) Add pooling layers to downsample features to accommodate the new species.
- ( ) Split them between dev and test and re-tune.
- (•) Put the new species' images in training data to learn their features.
- ( ) Augment your data to increase the images of the new bird.

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 they also hire you to build a Cat detector. You have a huge dataset of 100,000,000 cat images. Training on this data takes about two weeks. Which of the statements do you agree with? (Check all that agree.)

- [ ] Reducing the model complexity will allow the use of the larger data set but preserve accuracy.
- [x] This significantly impacts iteration speed.

  ✓ **Correct**
  Yes. This training time is an absolute constraint on iteration.

- [x] Lowering the number of images will reduce training time and likely allow for an acceptable tradeoff between iteration speed and accuracy.

  ✓ **Correct**
  Yes. There is a sweet spot that allows development at a reasonable rate without significant accuracy loss.