Quiz: Model Complexity

1. For a roughly linear distribution with little noise in the data (little deviation from line of best fit), would a perfectly mapping polynomial function generalize better than the line of best fit? Why?

Video: Model Complexity
Timestamp: Not in video, question is hypothetical situation

A. No. The linear function would generalize better since the distribution is almost linear and the polynomial function seems to be overfit and will not perform well on new data.

B. No. The linear model is better only due to the fact that computing the linear model is faster than the polynomial one. Else, both models will do equally well on new data.

C. Yes. Since the polynomial model has a lower loss value, it will obviously perform better than the linear model regardless of which data it is being tested on.

D. Yes. The polynomial function is always better due to its added complexity over the linear model, and complex models perform better than simple ones.

2. What is the paradox of counterproductive and excess model complexity called?

Video: Model Complexity
Timestamp: 0:03

A. Big-O complexity

B. Overwriting

C. Overfitting

D. Counterproductive work behavior (CWB)

3. Should a binary classifier (like the apple and banana classifier mentioned in the videos) with noise in its training dataset classify with maximum confidence? Why?

Video: Model Complexity
Timestamp: 1:20

A. Yes. If it predicts the value with higher confidence, there is a statistical advantage it gets, and achieves higher accuracy.

B. Yes. If it predicts the value with higher confidence, it always means that the model is well trained, and fits the training data the best.

C. No. If it predicts with maximum confidence, it means that the model is likely overfit, and can make wrong predictions with very high confidence, causing its accuracy to decrease.

D. No. Confidence is not desired since 100% accuracy is not the goal: the goal is to make good-enough predictions.

4. Which is a common way to reduce overfitting to an extent?

Video: Model Complexity
Timestamp: 3:05

A. Add more noisy training data and train for a longer time so that the model fits the training data perfectly.

B. Redo the training and hope that the model doesn't over fit this time around.

B. Overfitting is a permanent change to the dataset. It cannot be undone unless the dataset is redownloaded.

D. Remove noisy training data so that model complexity decreases and fits general data better.

5. What causes overfitting for a binary classifier similar to the apple-banana classifier shown in the videos?

Video: Model Complexity
Timestamp: 1:03

- A Noise in the training data, and excess training.
- B Memory Overflows during training
- C Low amount of training
- D Errors in code for training

6. What is a classic warning sign for overfitting?

Video: Model Complexity
Timestamp: 2:30

- A High accuracy on both training and test datasets.
- B High training loss at the beginning of training.
- C High loss on test data, but very low loss on training data.
- D Unreasonably high processing time

7. While training, should the model be trained such that confidence levels are generally as high as possible?

Video: Model Complexity
Timestamp: 2:15

- A No, this could facilitate overfitting
- B No, this will decrease accuracy during training
- C Yes, confidence should be maximised irrespective of scenario
- D Yes, confidence is the only reliable method to judge a model.