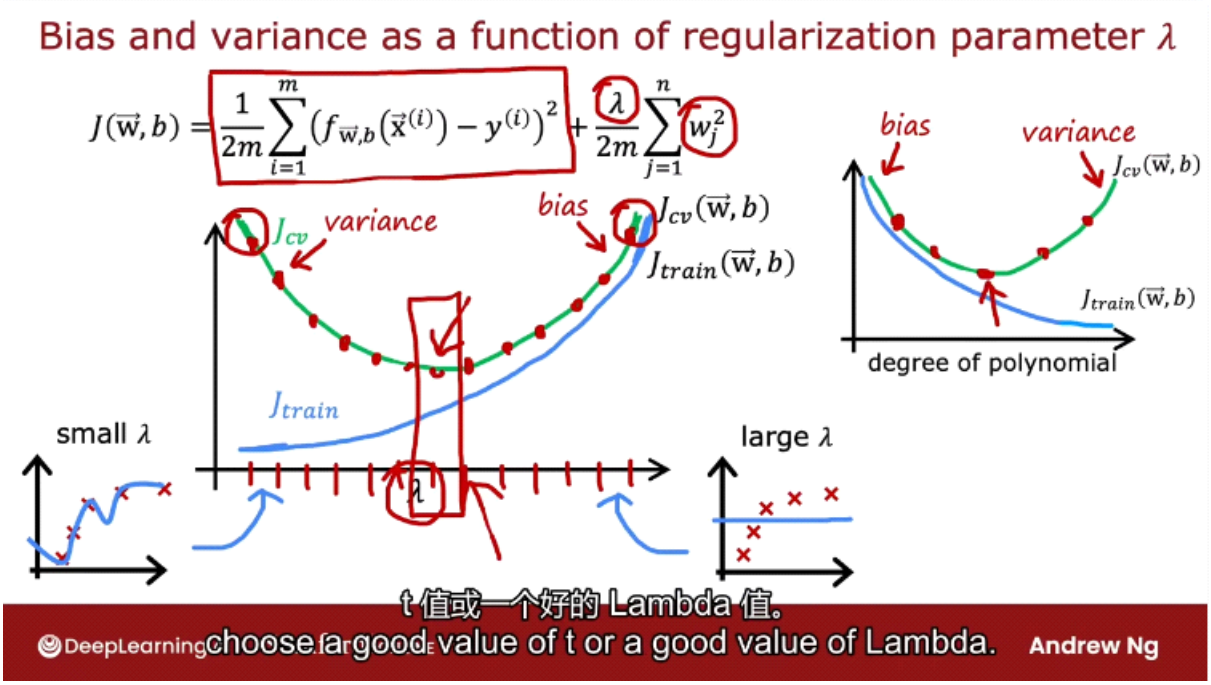
Choose model

2023年5月24日 20:52

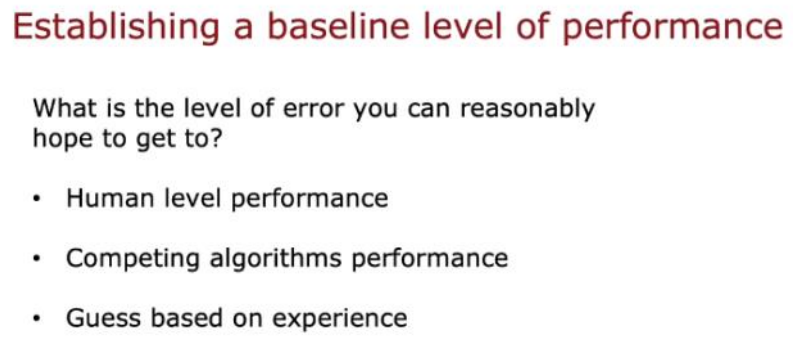
1.选择交叉验证数据集，用于选择合适的模型，选出合适模型后再
利用新的验证集去评估模型的性能
（交叉验证相当于对不同模型选择的一次学习，倾向于过拟合，不能用来评估模型的泛化程度）

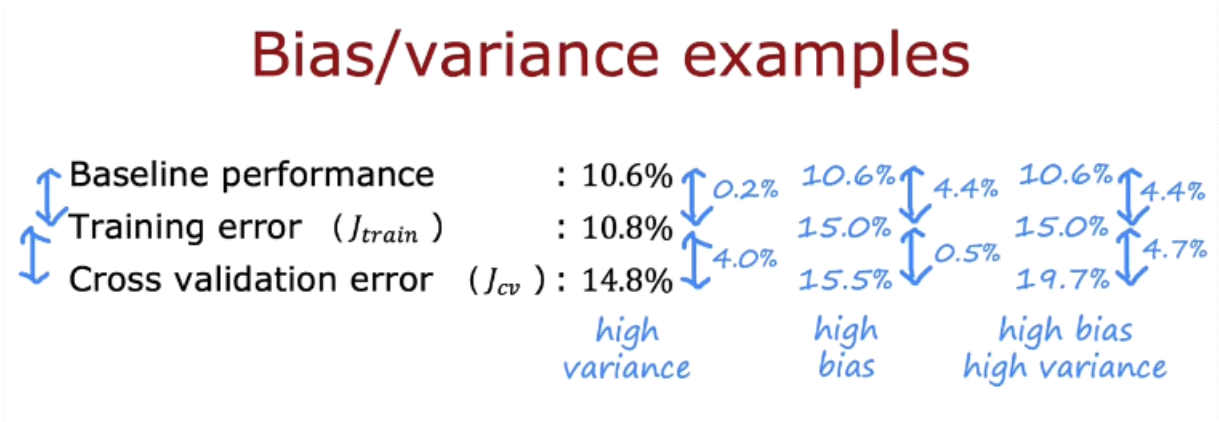
2.模型的Bias与Variance，来判断是欠拟合还是过拟合
（Both High，可能是部分过拟合而部分欠拟合，很糟糕）

3.正则化时，尝试不同λ，用交叉验证集选择合适的λ，再用test set评估。



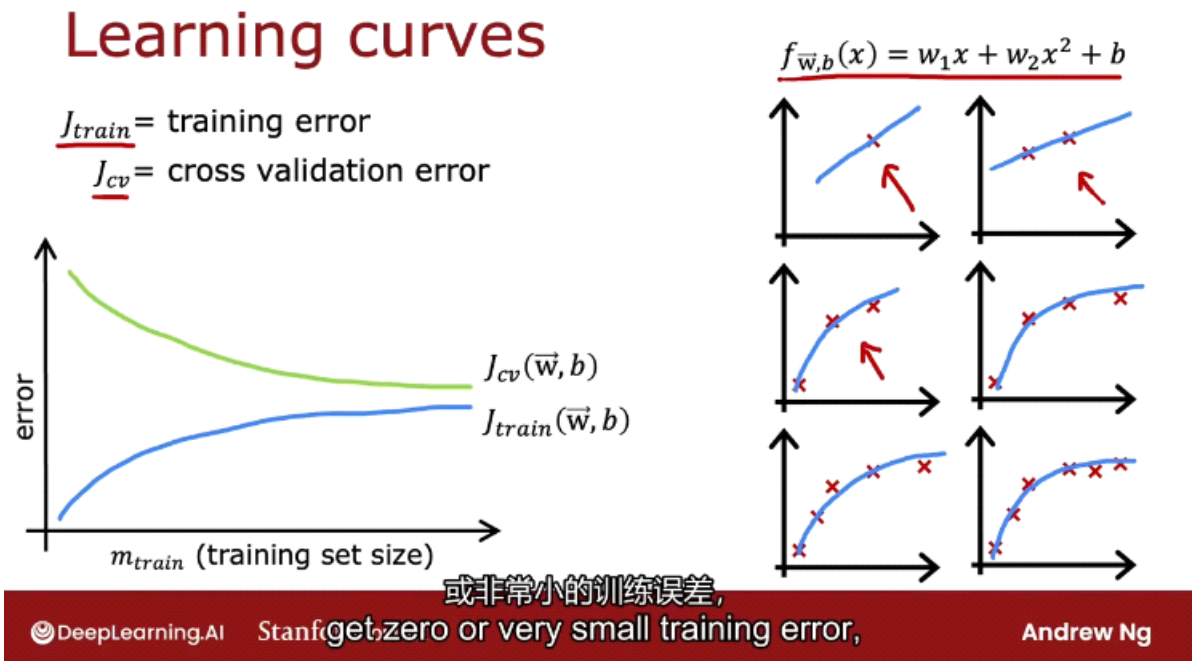
4.建立性能评估的基准：

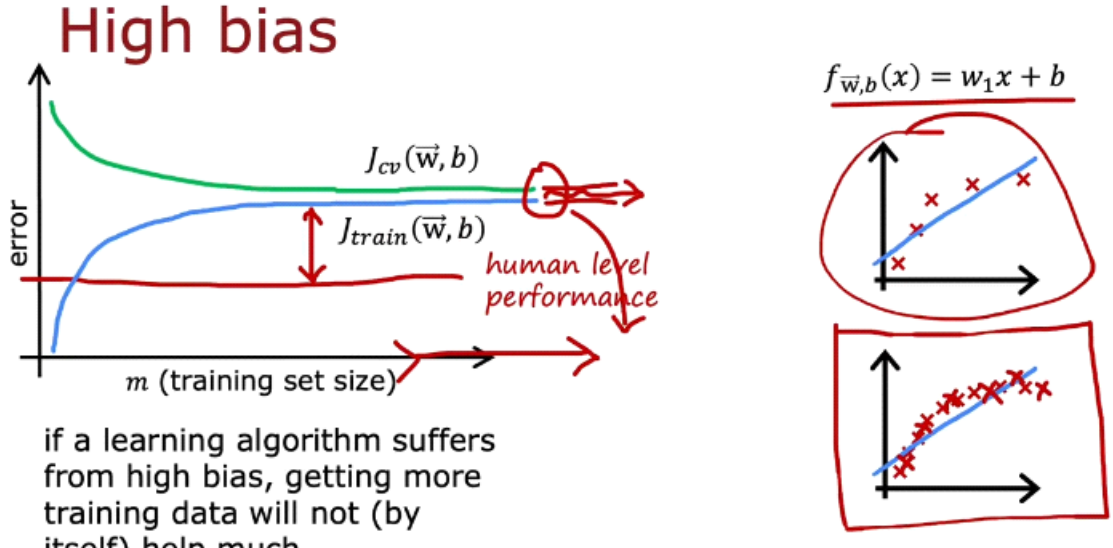




5.学习曲线

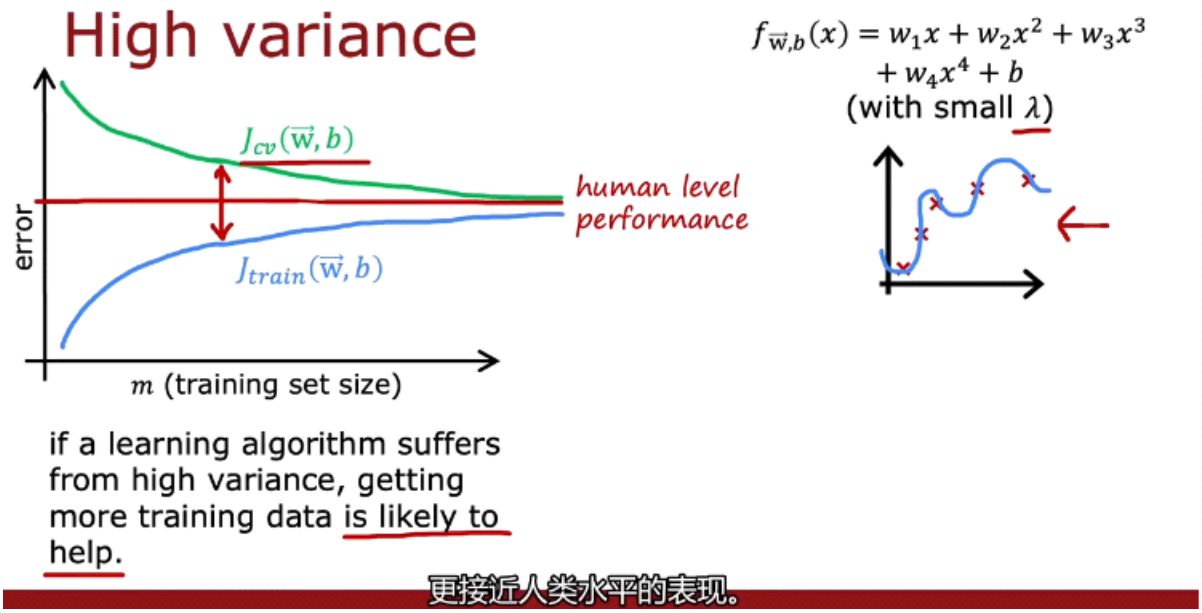
误差随训练集大小变化的曲线





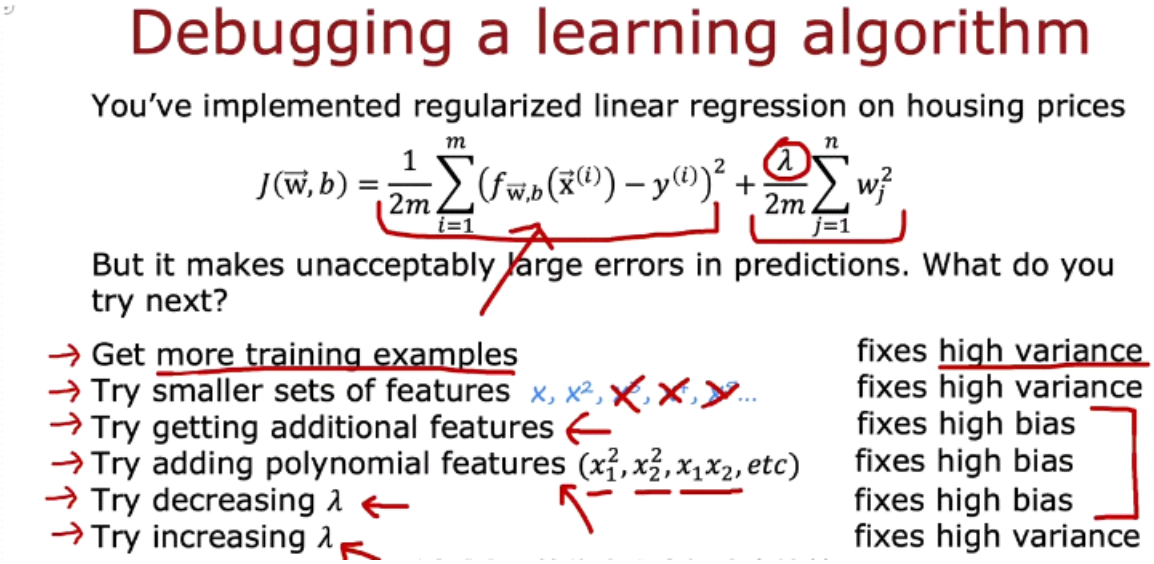
if a learning algorithm suffers from high bias, getting more training data will not (by itself) help much.

High Bias情况，数据集再大都不会有用



High Variance情况，数据集变大会让模型变更好

6.对一个线性回归模型，不同解决方法解决的问题：



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High Bias情况应该给予模型更高的灵活性

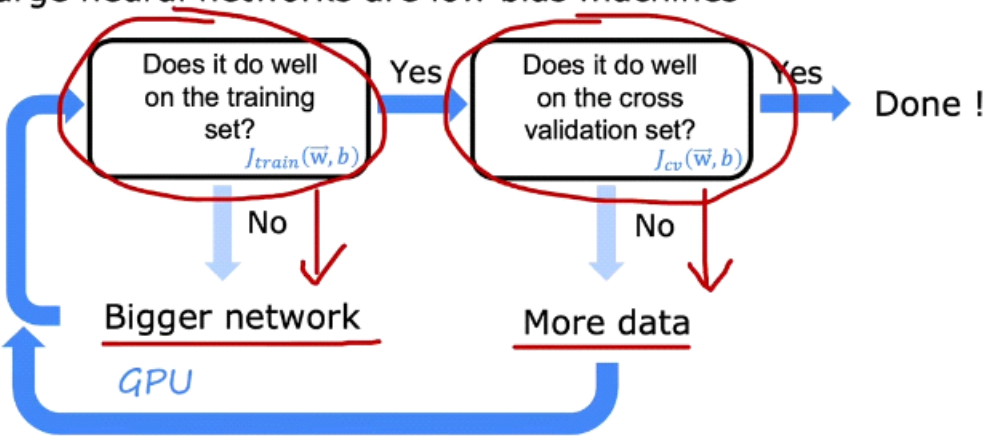
High Variance情况应该减小模型的灵活性，使其变得更平滑

7.Bias and Variance在神经网络中的应用

前提：如果神经网络足够大，则一定是Low Bias模型

Neural networks and bias variance

Large neural networks are low bias machines



Neural network regularization

$$J(\mathbf{W}, \mathbf{B}) = \frac{1}{m}\sum_{i=1}^{m} L(f(\vec{x}^{(i)}), y^{(i)}) + \frac{\lambda}{2m}\sum_{\text{all weights } \mathbf{W}} (w^2)$$

b

Unregularized MNIST model

```
layer_1 = Dense(units=25, activation="relu")
layer_2 = Dense(units=15, activation="relu")
layer_3 = Dense(units=1, activation="sigmoid")
model = Sequential([layer_1, layer_2, layer_3])
```

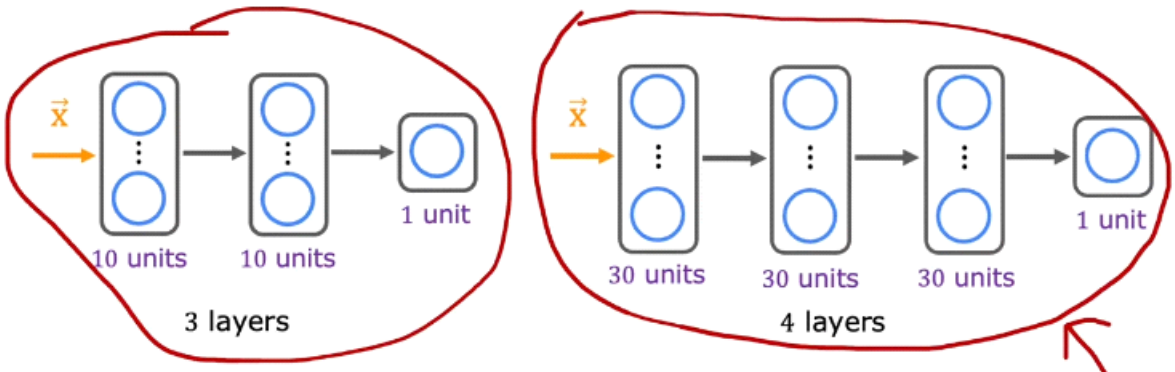
λ

Regularized MNIST model

```
layer_1 = Dense(units=25, activation="relu", kernel_regularizer=L2(0.01))
layer_2 = Dense(units=15, activation="relu", kernel_regularizer=L2(0.01))
layer_3 = Dense(units=1, activation="sigmoid", kernel_regularizer=L2(0.01))
model = Sequential([layer_1, layer_2, layer_3])
```

👆神经网络正则化（用得并不多）

Neural networks and regularization



A large neural network will usually do as well or better than a smaller one so long as regularization is chosen appropriately.

用更大的（正则化的）网络几乎永远没有坏处，除了会让计算更慢