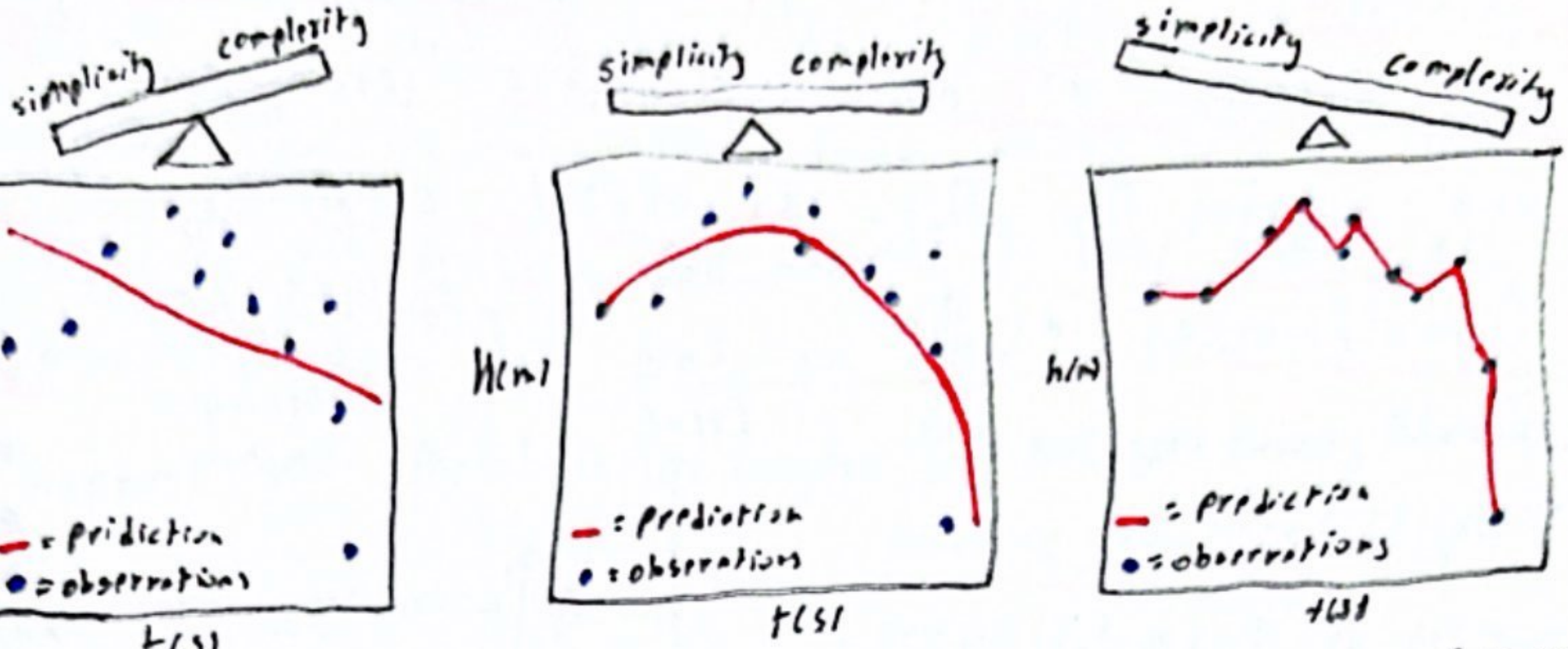
Model complexity

- refers to how complex a ML model is in terms of its ability to capture patterns in the data

Ex:



- a simple model has a few parameters and can only capture basic patterns like a liner Regration ex

Too simple

and model fails to capture important patterns called Underfitting

- Just Right ✓

this is what we need, a quadratic model.

* in a regration - like liner like has to predict slope & intercept (2 parameters) quadratic has to do more parameter = more complex higher deg polynomial = more complex

- a more complex model has more parameters and can learn more complicated relationships ex: like a NN with many layers

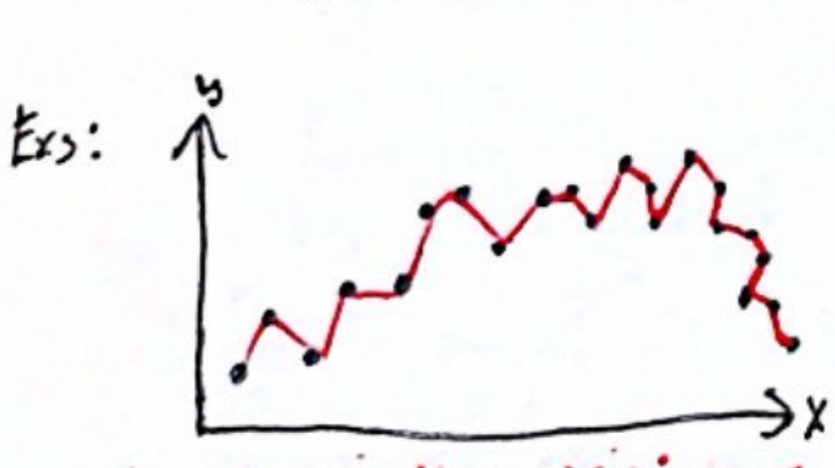
Too complex

and it learns to fit to noise in training data like memorizing the answers and so bad with new unseen data called overfitting

Bias and Variance

- Variance refers to how much a models predictions would change if it where trained on different subsets of the training data a model with high variance is very sensitive to small changes in training data so new data = much new prediction
- Bias in terms of model complexity refers to how limited or inflexable a models assumptions are about the patterns in data

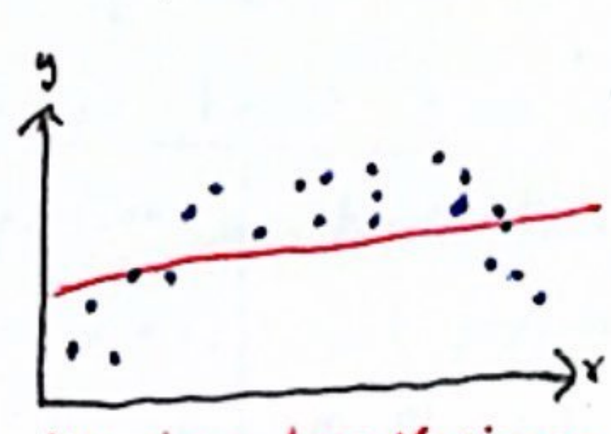
Ex:



Low Bias, High Variance

overfitting

- such low Bias fits the training data perfectly but fails to generlize well to unseen data (to good to be true, it's memorizing ans)

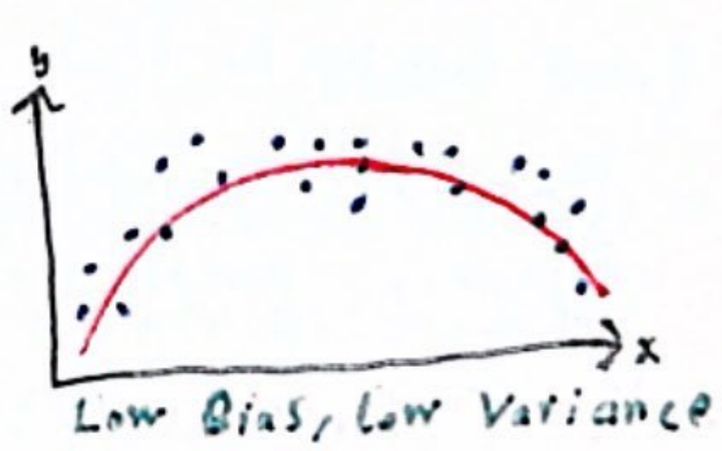


High bias, Low Variance

Under fitting

- Makes strong simple assumptions (linear pattern)

inc polynomial deg = Bias dec



Low Bias, Low Variance

Good Balance

- Low Bias = less Built in assumptions about data structure