Olatomiwa Akinlaja - ACML Assignment 1

Theoretical Questions

1. Feature reduction (dimensionality reduction) can help the overall performance of a machine-learning algorithm. Having less features means there are less learning points, hence why it is key to have less features rather ones that are of value to the overall hypothesis. Some methods for feature reduction are principal component analysis (PCA).

2. Using a fixed learning rate (alpha) provides a standard rate for the gradient descent algorithm to perform. A high learning rate might make the algorithm fail to converge by overshooting the global/local minimum. A low learning rate means the algorithm would perform slowly and take smaller steps to get to the global/local minima, so essentially slow convergence and long computational time.

3. The higher the degree of polynomial the more the variance increases and the less bias the model becomes.

Model	Bias	Variance
Linear regression	High	Low
Polynomial with degree 2	High	Low
Polynomial with degree 5	Low	High
Polynomial with degree 10	Low	High
Polynomial with degree 20	Low	High