Assignment-3

Polynomial Curve Fitting

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For 20 training data points :

1. For a data of 20 points chose lines with indexes which are multiples of 5 and trained this data.
2. Accuracy when we applied this data on 100 data points = 62% (without regularization).

3. Best fit for the polynomial is order = 7.
4. Below this order, we get under-fitting and above this order there was over-fitting.

5. When error taken = 1:
6. For lambda = 0, training accuracy = 85%, testing accuracy = 62%.
7. For lambda = 0.2, training accuracy = 90%, testing accuracy = 68%.
8. For lambda = 1, training accuracy = 90%, testing accuracy = 65%.
9. For lambda = 1.2, training accuracy = 80%, testing accuracy = 63%.
10. For lambda = 1.7, training accuracy = 75%, testing accuracy = 61%.

11. With regularization, when lambda is around 1 then accuracy is more than lambda = 0. But if we increase lambda more than this then accuracy starts to decrease.

For 100 training data points :

1. When error taken = 1:
2. For lambda = 0, training accuracy = 80%, testing accuracy =80%.
3. For lambda = 0.5, training accuracy = 81%, testing accuracy = 81%.
4. For lambda = 0.8, training accuracy = 83%, testing accuracy = 83%.
5. For lambda = 1.2, training accuracy = 82%, testing accuracy = 82%.
6. For lambda = 1.7, training accuracy = 80%, testing accuracy = 80%.
7. For lambda = 5, training accuracy = 76%, testing accuracy = 76%.

8. Without regularization Noise variance = 0.6092