

CS5011 – Machine Learning

SOFTWARE ASSIGNMENT - 1

1. Regression - Polynomial Fitting:

Consider the problem of fitting one-dimensional data with a polynomial. Write an R code to:

- i) Plot function y given in “Q2_fun_xx”.
- ii) Randomly extract 100 points from the function and add normally distributed noise to the data points to get “noisy data”, $\hat{y}$.
- iii) Fit polynomial of degree d (values given in the table 1 below) to the noisy data.
- iv) Compute the bias and variance for the models fitted.
- v) Plot the bias-variance plot.

Functions: (Code for both functions)

$$\text{Q2_fun_01: } y = e^{-5(x-0.3)^2} + 0.5 e^{-100(x-0.5)^2} + 0.5 e^{-100(x-0.75)^2}$$

$$\text{Q2_fun_02: } y = 2 - 3x + 10x^4 - 5x^9 + 6x^{14}$$

Deadline : 25/02/2019

Table 1:

S.No	Roll number	d values		
1	CS18M509	1	9	18
2	CS18M510	2	10	19
3	CS18M511	3	11	20
4	CS18M512	4	12	21
5	CS18M513	5	13	22
6	CS18M514	6	14	23
7	CS18M515	7	15	24
8	CS18M516	8	16	25
9	CS18M517	1	17	18
10	CS18M518	2	9	19
11	CS18M519	3	10	20
12	CS18M520	4	11	21
13	CS18M522	5	12	22
14	CS18M523	6	13	23
15	CS18M524	7	14	24
16	CS18M525	8	15	25
17	CS18M526	1	16	18
18	CS18M527	2	17	19
19	CS18M528	3	9	20
20	CS18M529	4	10	21
21	CS18M530	5	11	22
22	CS18M531	6	12	23
23	CS18M532	7	13	24
24	CS18M504	8	14	25
25	CS18M505	1	15	18
26	CS18M507	2	16	19
27	CS18M502	3	17	20
28	CS18M503	4	9	21