Data Science Workshop-2 (CSE 2196)

ASSIGNMENT-3 (Linear and Polynomial Regression)

1. Explain normal equation method to estimate the parameters of multiple linear regression. Write a function for it.

2. A college professor believes that if the grade for internal examination is high in a class, the grade for external examination will also be high. A random sample of 10 students are selected, and the data is as follows:

   Marks_internal examination (X)= [15, 23, 18, 23, 24, 22, 22, 19, 19, 16]

   Marks_external examination (Y) = [49, 63, 58, 60, 58, 61, 60, 63, 60, 52]

   Find the polynomial regression model of degree 3 and linear regression model from the above data.

3. Explain Gradient Descent method in context of linear regression.

4. List and explain the issues of Linear Regression model.

5. Write the difference between gradient descent and normal equation method for regression coefficients estimation.

6. What is difference between simple linear and multiple linear regressions?

7. Suppose we have data for a retail company. The company wants to understand how their advertising expenses in various channels (e.g., TV, Radio) impact sales. Predict sales using Multiple Regression model using both TV and Radio advertising expenses for the following dataset.

	TV	Radio	Sales
0	127.44	66.95	716.54
1	135.76	56.75	660.01
2	130.14	68.38	658.56
3	127.24	74.05	679.68
4	121.18	56.22	632.94
5	132.29	64.40	751.38
6	121.88	64.80	691.32
7	144.59	64.31	732.85
8	148.18	55.58	691.15
9	119.17	73.82	693.58