University of Karachi
Department of Computer Science
BSSE-603
Course Supervisor: Ms. Shaista Rais

Multiple Regressions are a method to predict the dependent variable with the help of two or more independent variables. While running this analysis, the primary purpose of the researcher is to find out the relationship between the dependent and independent variables. To predict the dependent variable, multiple independent variables are chosen, which can help in predicting the dependent variable. It is used when **linear regression** is not able to serve the purpose. Regression analysis helps in the process of validating whether the predictor variables are good enough to help in predicting the dependent variable. Consider the given dataset and find out multiple regression equation.

	y	x1	x2	x1^2	x2^2	y.x1	y.x2	x1.x2
	45	8	4	64	16	360	180	32
	44	7	5	49	25	308	220	35
	50	8	6	64	36	400	300	48
	43	6	6	36	36	258	258	36
	45	9	5	81	25	405	225	45
	44	8	3	64	9	352	132	24
	40	9	4	81	16	360	160	36
	43	6	5	36	25	258	215	30
sum	**354**	**61**	**38**	**475**	**188**	**2701**	**1690**	**286**
mean	**44.25**	**7.625**	**4.75**					

we have

$$\sum x1^2 = \sum x1^2 - \frac{(\sum x1)^2}{N}$$ 9.875

$$\sum x2^2 = \sum x2^2 - \frac{(\sum x2)^2}{N}$$ 7.5

$$\sum x_1 y = \sum X_1 Y - \frac{(\sum X_1)(\sum Y)}{N}$$ 1.75

$$\sum x_2 y = \sum X_2 Y - \frac{(\sum X_2)(\sum Y)}{N}$$ 8.5

$$\sum x_1 x_2 = \sum X_1 X_2 - \frac{(\sum X_1)(\sum X_2)}{N}$$ -3.75

substitute he values in equations given below:

$$b_1 = \frac{(\sum x_2^2)(\sum x_1 y) - (\sum x_1 x_2)(\sum x_2 y)}{(\sum x_1^2)(\sum x_2^2) - (\sum x_1 x_2)^2}$$ 0.75

and

$$b_2 = \frac{(\sum x_1^2)(\sum x_2 y) - (\sum x_1 x_2)(\sum x_1 y)}{(\sum x_1^2)(\sum x_2^2) - (\sum x_1 x_2)^2}$$ 1.50833

$$b_o = \overline{Y} - b_1\overline{x_1} - b_2\overline{x_2}$$ 31.3667

multiple regression equation: y = 31.3667 +0.75x1 + 1.50833x2

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Assignment

Income ($)	Age	Experience (In Years)
26315	18	5
39493	20	7
37209	22	8
24380	23	6
25751	23	7
44629	25	5
38616	2	8
33305	28	6
36848	29	5
42551	32	7
25700	37	9
37303	41	6
24659	46	7
32617	49	8
35771	53	6

Question: Consider the given data in the table above and find out the relation between the salary of a group of employees in an organisation and the number of years of experience and the age of the employees.

Also, show the scatter plots of the given data.