Experiment 2

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**Aim:** To perform linear regression and find errors the model is associated with.

**Theory:** Linear regression is one of the most popular supervised machine learning algorithms. Its a statistical method of used for predictive analysis. Linear regression makes prediction for continuous /real or numeric variables such as sales, salary, age, etc. Linear regression shows a linear relationship between the variables by giving a sloped straight line.

Mathematically, we can represent a linear regression as $y = b_0 + b_1 x + \varepsilon$

$y$ = Dependant variable

$x$ = Independent variable

$b_0$ = Intercept of line

$b_1$ = Linear regression coefficient

$\varepsilon$ = random error

The values for $x$ & $y$ variable are training dataset for linear regression model representation.

**Procedure:**

In the procedure we aim to simply perform Simple Linear regression using the latest least square method without relying on the scikit library. To initiate

the process we start by calculating the mean values X & Y, Next we calculate the deviations of each data point from their respective means. Following this we get the slope (m) of the regression line is determined by diving the sum of squared deviations from the mean of X. Subsequently, the intercept (b) is computed using mean values of X & Y along with the calculated slope. The regression slope equation is formed as $Y = mx + b$, providing for corresponding X values optionally, the results can be varied.

Observed / Discussed result.

The provided python code implemented without external libraries conduct linear regression on a dataset. The linear regression on a dataset. The linear regression calculate slope (m), intercept (b), mean square error (MSE) & R-squared ($R^2$)

Conclusion:

Hence, linear regression is a very useful predictive machine learning algorithm.