University Institute of Engineering

Department of Electronics & Communication Engineering

Experiment No. :- 6

Student Name: Priyanshu Mathur
UID: 20BEC1073
Branch: Electronics and Communication
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1. Aim of the practical: Write a program for a multivariable linear regression.

2. Theory:

A statistical technique called Multivariable Linear Regression is used to simulate the relationship between a dependent variable (the target) and many independent variables (features or predictors). The objective is to identify the linear equation that most accurately describes the data so that we may make predictions based on the values of the independent variables. You may see the linear equation as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + \varepsilon$$

Where:

- Y is the dependent variable (target).
- β_0 is the intercept.
- $\beta_1, \beta_2, \ldots, \beta_n$ are the coefficients for the independent variables $X_1, X_2, \ldots, X_n$.
- ε represents the error term, which accounts for the unexplained variability in the data.

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3. Steps for experiment/practical:

- Data Collection: Gather a dataset that includes the dependent variable and one or more independent variables.
- Data Preprocessing: Clean and prepare the data, handling missing values, and encoding categorical variables if necessary.
- Split the Data: Divide the dataset into a training set and a test set. This is essential to evaluate the model's performance.
- Model Selection: Choose the appropriate model. In this case, we use the Linear Regression model.
- Model Training: Fit the model to the training data to learn the coefficients
- Model Evaluation: Use the test set to make predictions and calculate an evaluation metric, such as Mean Squared Error (MSE), to assess the model's accuracy.
- Model Deployment: Once satisfied with the model's performance, it can be used to make predictions on new, unseen data.

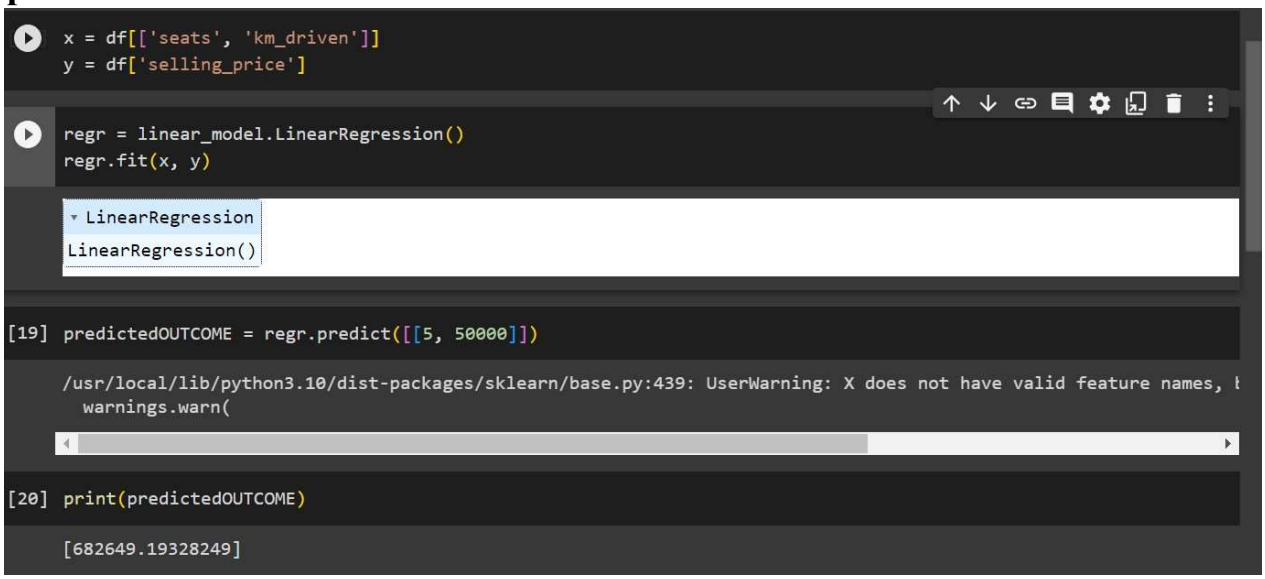
4. Program Code and Simulation Output:

Code:-

```
import pandas from sklearn import

linear_model df = pandas.read_csv("Car

details v3.csv") x = df[['seats',

'km_driven']] y = df['selling_price'] regr =

linear_model.LinearRegression() regr.fit(x,
```

```
y) predictedOUTCOME = regr.predict([[5,

50000]]) print(predictedOUTCOME)
```

Output: -



Result and Discussion: -

- **Result:** Predicted Selling_price for a 5 seater car which is 50000 kms driven is 682649.19328249, using a linear regression model.
- **Discussion:** The model estimates Selling_price based on No. of seats and km_driven, providing a practical application in the used car market.

Learning outcomes (What I have learnt):

- Learnt about linear regression of single and multiple variables.
- Learnt about applications of linear regression.
- Learnt about data handling and feature selection using pandas.