TRANSPORTATION:
Car Price Prediction Using Multi Linear Regression

Artificial Intelligence Pre-MidSem Task

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Introduction

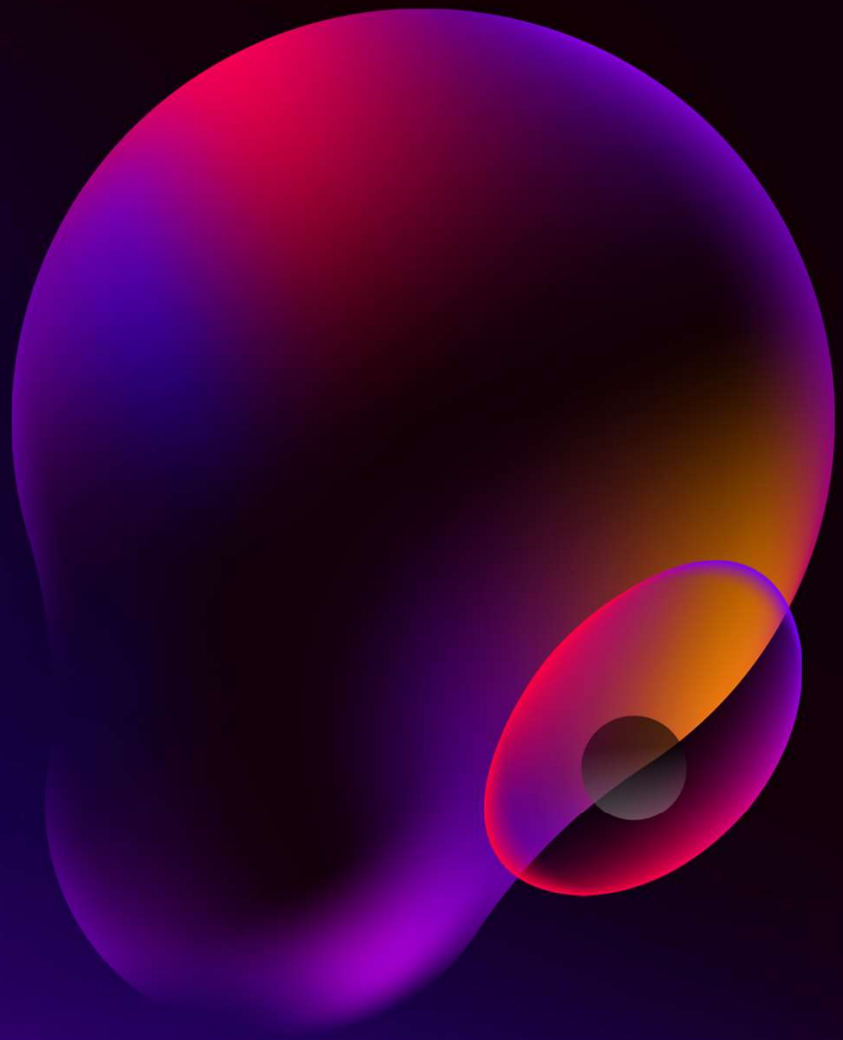
We want to get model of correlation between **car price** and **several factors,** such as fuel type, wheel base, engine size, etc, using **multi linear regression.**

Hence, we can **predict the car price** for specific configuration.

Problem

For industries
Need real model of car pricing
based on its specification

For consumen
Need a prediction of car price
before buy specific car



Method

Multi Linear Regression

- Has many features that continue

➔ Wheel base, car length, car width, car height, etc (complete in simulation)

➔ However, it has categorical features, we can do One Hot Encoding

- The features (by intuition) has (mostly) linear relation with output
- The output (price) is continue

Why not ID3, C4.5?

This method is suit for categorical features and limited continuous features, not for this case.

Multi Linear Regression

Processing dataset

Selecting features, editing categorial features, selecting output, separating train and test data

Do Multi Linear Regression

Estimation matrix W can be produced from

$$
\begin{aligned}
& y = Xw \\
X^T \cdot | \quad & y = Xw \\
& X^T y = X^T X w \\
(X^T X)^{-1} \cdot | \; & X^T y = X^T X w \\
& (X^T X)^{-1} X^T y = w
\end{aligned}
$$

Main equation: $\boxed{w = (X^T X)^{-1} X^T y}$

Multi Linear Regression (Cont)

Measuring Performance Parameters

Mean Squared Error, Root Mean Squared Error, and Goodness of Fit (R square)

Test Model

Plotting predicted vs real value of car price

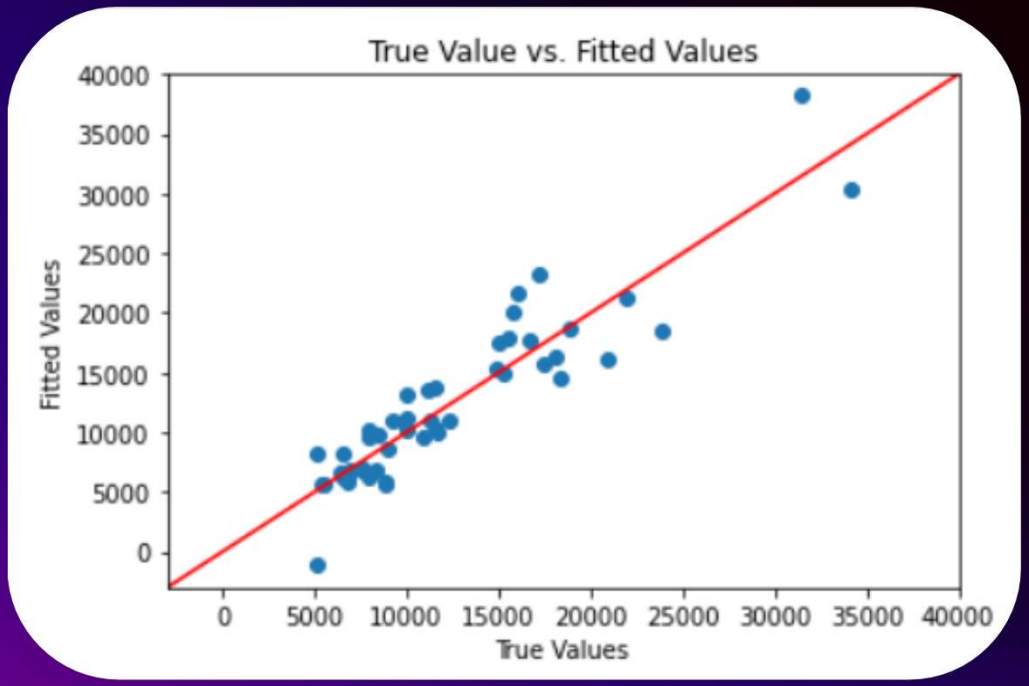
Result

Error and Goodness of Fit

```
In [14]: # Printing mse, rmse, and R square
         mse(y_preds, y_test), rmse(y_preds, y_test), r2(y_preds ,y_test)

Out[14]: (12601760.421360554, 3549.895832466152, 0.8324814865868458)
```

True vs Fitted/Predicted Value



Conclusion

Model

The model obtained has good accuracy (R^2 = 0.832) for real data

Objective

This prediction model can be used for predicting car price (for the year in dataset)

Method

From the model obtained, and the objective achieved, we can say that the method used is suitable for this case

Thanks!

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