Prediction of Tariff Rate

Dr. K. Sree Ram Murthy[1], Dr.K.Kranthi Kumar[2], D.Sai krishna[3], D.Sai Prasad[4], Manideep Reddy Dara[5], G.Divya[6]

[1,2]Associate Professor, Department of Information Technology, Sreenidhi Institute of Science and Technology, Telangana, India

[3,4,,5,6]B. Tech Student, Department of Information Technology, Sreenidhi Institute of Science and Technology, Telangana, India

---***---

Abstract - *Tariff is a list of expenses that incur while transporting the goods from one distance to another distance. Tariff is also dependent on seasonal and non-seasonal factors also. This project is aimed at predicting the tariff rates for truck load by using the different machine learning algorithms like lasso regression, elastic net regression, ridge regression and linear regression. Tariff is a combination of lot of things and tariff rate is dependent on some of the factors like Year, Road, Seasonal Impact, Fuel Cost, Distance, Weight, Toll charge, Demand, labour cost, travel expenses etc. Using some of these factors and by employing the above-mentioned machine learning regression algorithms we will be trying to predict the tariff rates on the trucks. By doing this we can help the industries to estimate the tariff rates so that they can take the necessary actions and they can make their business run in profitable way. This model helps small- and large-scale firms to control and manage the cost on transport.*

Key Words: **Machine learning, Linear regression, Lasso regression, Ridge regression, Elastic net regression, Tariff rate.**

1. INTRODUCTION

This project deals with the problems of tariff rates prediction for this purpose a gaggle of choices characterizing the tariff rate area unit used to predict the tariff rate. Variety of the factors to be coarctated are seasonal Impact, Fuel Cost, Distance, Toll charge. Few of these factors we tend to area unit progressing to conclude relating to the tariff rates of truck on wholly various things by applying the machine learning models. Tariffs might be a listing of expenses that incur whereas transporting the merchandise from one-distance to a unique distance. Ability to incorporate external factors listed beneath factors heading below. This project is back-geared toward predicting the tariff rates for truck load. Factors (to be included) Year, Road, seasonal Impact, Fuel Cost, Distance, Weight, Toll charge, Demand, Travel expenses[6]. Pattern few of these factors we tend to area unit progressing to concluded relating to the tariff rates on the trucks. Machine Learning is one in all the foremost hot analysis topics in engineering, which is applicable in several disciplines. It provides a set of algorithms, strategies and tools able to embody some reasonably intelligence to machines. The facility of metric capacity unit is that the provided modelling tools, that can be trained, via a learning procedure, with a collection of information describing a downside and to reply to similar unseen information with a typical method. Machine learning plays a serious role from past years in image detection, spam reorganization, normal speech command, product recommendation and diagnosing. Gift machine learning algorithm helps U.S.A. in enhancing security alerts, guaranteeing public safety and improve medical enhancements. Machine learning system additionally provides higher client service and safe automobile systems.

1.1 Linear regression

Linear Regression could be a machine learning formula supported supervised learning. It performs a regression task. Regression models a target prediction worth supported freelance variables. It is mostly used for locating out the link between variables and prognostication. Different regression models disagree supported – the type of relationship between dependent and freelance variables, they're considering and the range of freelance variables getting used.

1.2 Lasso regression

The lasso regression model was developed in 1989. It's primarily another to the classic least squares estimate to avoid several of the issues with over fitting once we have an outsized number of freelance variables. By mistreatment giant constant, we tend to are golf shot a large stress on the actual feature that it will be a good predictor of the result. And once it's overlarge, the rule starts modelling knotty relations to calculate the output & finishes up over fitting to the actual information. Lasso regression adds an element of the total of absolutely the price of the coefficients the improvement objective[1][2].

1.3 Ridge regression

Tikhonov Regularization, informally referred to as ridge regression, is that the most typically used regression algorithmic rule to approximate a resolution for an equation with no distinctive solution. This type of downside is extremely common in machine learning tasks, wherever the "best" resolution should be chosen mistreatment restricted knowledge[1][2].

1.4 Elastic Net regression

In statistics and, specially, within the fitting of linear or provision regression models, the elastic net could be a regularized regression technique that linearly combines the L1 and L2 penalties of the lasso and ridge ways[2].

2. EXPERIMENT ANALYSIS
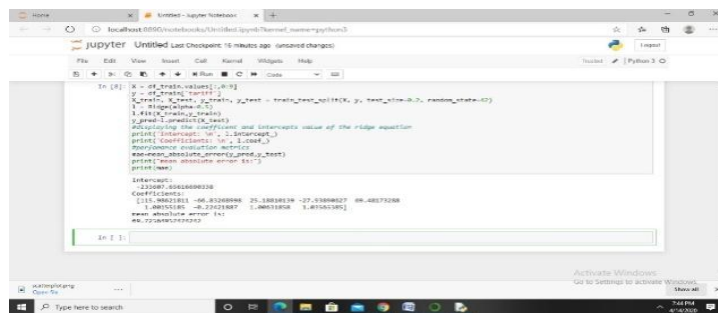
Fig 2.1: Ridge regression result

After building the ridge regression model we will be displaying the coefficients and intercepts values of the ridge equation. After that we will be displaying the performance evaluation metric which is mean absolute error.
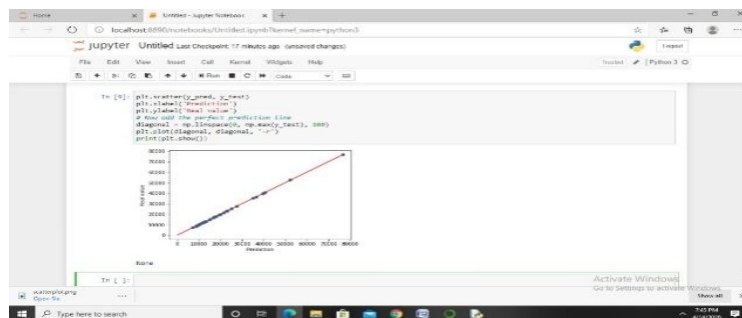

Fig 2.2: Ridge regression line

By using the predicted values of the ridge regression model and actual values we will be plotting the points and we will draw a perfect prediction line for that point.
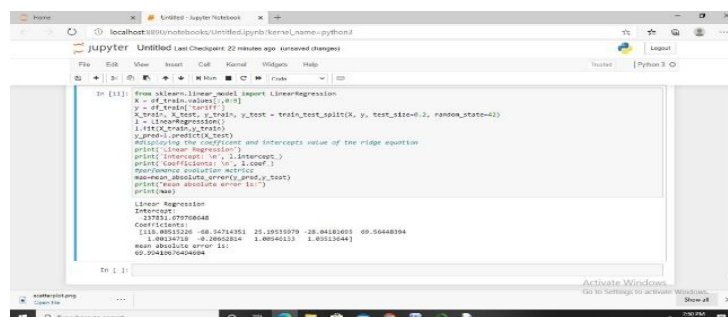

Fig 2.3: Linear regression result

After building the linear regression model we'll be displaying the coefficients and intercepts values of the ridge equation. Subsequently we'll be displaying the performance analysis metric that is mean absolute error.
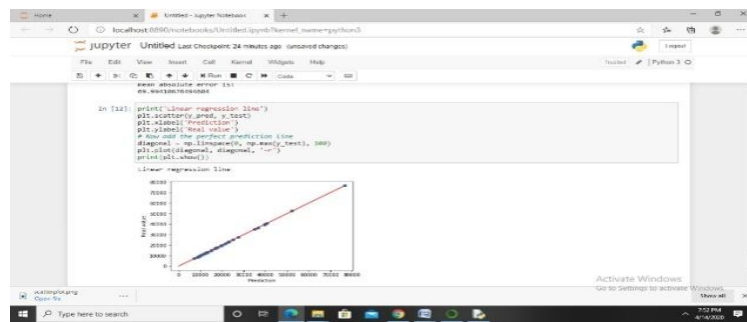
Fig 2.4: Linear regression line

By using the forecast values of the linear regression model and definite values we will be intrigue the points and we will draw a flawless prediction line for that point.
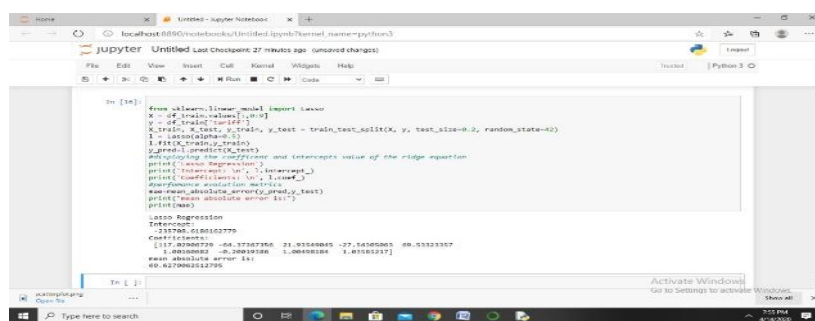

Fig 2.5: Lasso regression result

After building the lasso regression model we'll be displaying the coefficients and intercepts values of the ridge equation. Afterward we'll be displaying the performance analysis metric that's mean absolute error.
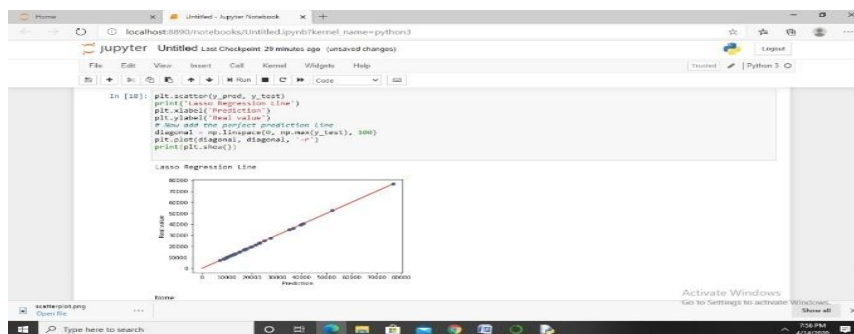

Fig 2.6: Lasso regression line

By using the foretold values of the lasso regression model and concrete values we will be trickery the points and we will draw a seamless prediction line for that point.
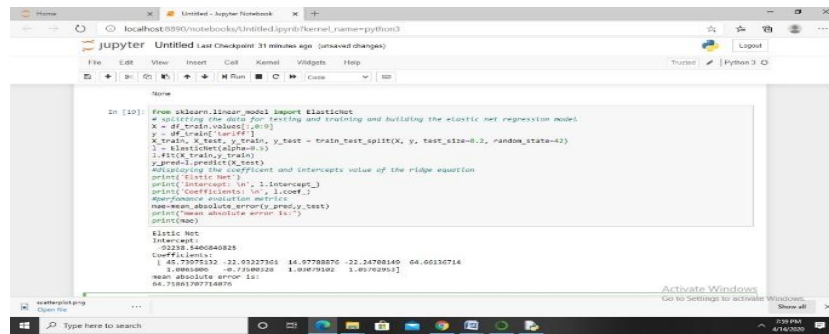
Fig2.7: Elastic net regression result

After building the elastic net regression model we will be displaying the coefficients and intercepts values of the ridge equation. After that we will be displaying the performance evaluation metric which is mean absolute error.
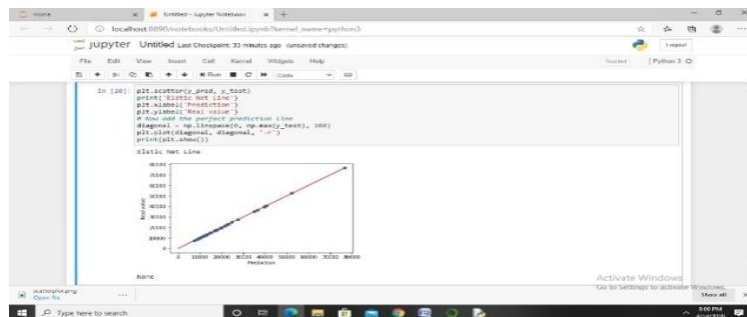

Fig 2.8: Elastic net regression line

By victimization the anticipated values of the elastic net regression model and genuine values we are going to beplotting the points and that we can draw an ideal prediction line for that individual point.

Table -1: Results

ML Model	MeanAbsolute Error
Ridge Regression	69.72
Linear Regression	70
Lasso Regression	69.63
Elastic Net Regression	64.7

3. CONCLUSION

We have managed out a way to prepare a model that offers users a best approach with take aglance at future worth predictions. By exploitation the info that we have a tendency to gathered from the web we showedthat it's possible to predict the tariffs rates that helps in many ways that anyone will predict thetariff rates through all tolls and seasonal variations.

REFERENCES

[1]   https://towardsdatascience.com/intuitions-on-l1-and-l2-regularisation.

[2]   https://hackernoon.com/an-introduction-to-ridge-lasso-and-elastic-net-regression-cca60b4b934f

[3]   https://www.kaggle.com/anuragpand/tariff-truck

[4]   https://jupyter.readthedocs.io/en/latest/install.html.

[5]   https://www.sih.gov.in/sih2020PS/QWxs/U29mdHdhcmU=/QWxs/QWxs?page=2