**APPENDIX 1**

**PRICE ESTIMATION OF USED CARS**

END TERM REPORT

***By***

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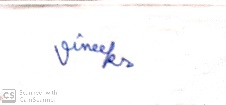
**Lovely Professional University, Jalandhar**

04-2020

**APPENDIX 2**

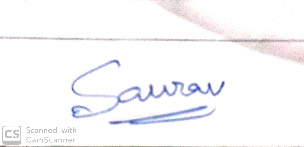
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Place: - Kota, Raj.

Date : - 09-04-2020

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**BONAFIDE CERTIFICATE**

Certified that this project report “ Price Estimation of Used Cars ”is the Bonafede work of “ Vineet Kumar & Saurav Kumar Jha ” who carried out the project work under my supervision.

Name of Supervisor : - Dr V. DEVENDRAN

Academic Designation : - Professor

ID of Supervisor : - 22735

Department of Intelligent Systems

INTRODUCTION

**The Problem**

The prices of new cars in the industry is fixed by the manufacturer with some additional costs incurred by the Government in the form of taxes. So, customers buying a new car can be assured of the money they invest to be worthy. But due to the increased price of new cars and the incapability of customers to buy new cars due to the lack of funds, used cars sales are on a global increase. There is a need for a used car price prediction system to effectively determine the worthiness of the car using a variety of features. Even though there are websites that offers this service, their prediction method may not be the best. Besides, different models and systems may contribute on predicting power for a used car’s actual market value. It is important to know their actual market value while both buying and selling.

**The Client**

To be able to predict used cars market value can help both buyers and sellers.

**Used car sellers (dealers):** They are one of the biggest target group that can be interested in results of this study. If used car sellers better understand what makes a car desirable, what the important features are for a used car, then they may consider this knowledge and offer a better service.

**Online pricing services:** There are websites that offers an estimate value of a car. They may have a good prediction model. However, having a second model may help them to give a better prediction to their users. Therefore, the model developed in this study may help online web services that tells a used car’s market value.

**Individuals:** There are lots of individuals who are interested in the used car market at some points in their life because they wanted to sell their car or buy a used car. In this process, it’s a big corner to pay too much or sell less then it’s market value.

**Contribution Done : -**

1. Vineet Kumar

Done all project work including coding and collecting the information

1. Saurav Kumar Jha

Helped in collecting information and making report file.

**Implementation & Technologies used**

So, in this topic I am going to estimate the price of the used cars using Linear Regression method. So linear regression method is the statistical modal that can be used for prediction.

So, to start with we need to first import the respective packages i.e. “pandas”, “matplotlib”, “tain\_test\_split”, “Linear Regression”. So, in first we have excel sheet which is having detail of 20 cars like Mileage, Age of cars and the Sell Price.

So, In [2] we are reading the csv file and displaying it. So, for first car Mileage is 69000, its age is 6 yrs. and its selling price is Rs 1,80,000. So, we will use this data of 20 cars sold into two parts. We will split this data into two parts. The first set of data we will call it as training data, the other set of data we will call it as training data. The reason we will do it is we want to see accuracy of this model.

So, based on this data first we will plot to see relation between the mileage and the selling price and the age and the selling price. So here u can see that mileage and age are two independent variables and selling price is dependent variable. Selling price is dependent on Mileage and Age. So, we will plot this and see what is relationship between Mileage and Sell Price, and Age and Sell Price. So here we are using scatter function which is available in matplot package. In X axis I am plotting the Mileage and in Y axis I am plotting Sell price. So here you can see higher the Mileage the lesser the sell price so you can say that mileage is inversely proportional to Sell Price and it is having some kind of linear relationship. So, if we draw a line so it is more or less a straight line.

Now let’s see the relation between Age and Sell Price and again we can see that it is more or less a linear graph. This is the reason we are proposing the linear regression method. As we have discussed we will be using the same data for testing and training but we will be splitting the data into two parts, the first part is for training and second part for splitting. So here we call a function as train test split (In 8) and we are passing the data and then we are mentioning that the split size is 0.2 which means that 20 % of this data will be used for test. So, out of 20 data 4 of them will be used as testing and data of 16 cars will be used as train. Now the outcome of the function is x\_train, x\_test, y\_train, y\_test. So, x\_train is showing the data of shuffled 16 cars. And If we see in x\_test 4 cars details will be showed. So here we are divide the same data into two parts.

So Linear Regression as it suggests, it will try to model the data linearly, so it assuming that as the Mileage increases the same price decreases linearly and as age increases prices decreases linearly. So, this is the simplicit modal which can be used for prediction and it will show how good we are at predicting. There are other modals available but this is a core method to start with. So in In (13) we are using the function Linear Regression and just fitting training the modal and after training the modal we are predicting using the function, so we are passing the data x\_test. So, using this we are predicting the outcome. So, in Out (15) you can see that output and we are also printing the test data just to compare how accurate is the prediction. So here if wee see for 4 cars the, for 15th car the sell price was 35000 whereas the predicted price is 381884. So, it is more or less near tot the values but not same and so on. Now let’s calculate the accuracy of this modal. We can do so by using score function where we are padding the x\_test and y\_test which is 89%.

So, in this way we can predict the price of a car and there are number of ways available and we can use Linear Regression method because it is used to our requirement.

**S.W.O.T Analysis Achieved**

One of the foremost rents regarding a used car dealership is that these businesses are almost always able to remain profitable and cash flow positive at all times. Even during economic recessions, the demand for used vehicles remain strong as many people opt to purchase a preowned vehicle rather than acquiring a new one. These businesses are able to generate a substantial number of revenue streams not only from the sale of the vehicle, but also from financing and repair services as well. In fact, one of the primary profit centers for most used car dealers is their financing arm. The interest rates that are associated with these types, and many financial institutions are willing to partner with vehicle dealerships in order to provide financing to the end-user. One of the other good things about a used car dealership is that they have readily available access the capital given the very large inventory and tangible asset base of the business.

As relates to weaknesses, used car dealers are subject to a number of laws and regulations regarding the sales of vehicles. Additionally, the operating expenses associated with a used car dealership are relatively high given that a large-scale lot must be maintained as well as a staff of mechanics and salespeople. These businesses often also have extremely high marketing expenditures although the use of the Internet can substantially reduce these costs on an ongoing basis.

As it relates to opportunities, used car dealers can expand by simply increasing their inventory of cars that they hold on their lot. Additionally, many vehicle dealers will frequently use online sales platforms in order to ensure that inventory turnover is kept very high. Many used car dealers will also develop internal financing programs that will allow for a boosted profit margin on each car sold as many people that purchased used vehicles often obtain credit facilities to do so. The used car dealer can also expand by simply establishing additional locations from which they can sell cars to the general public. Most financial institutions are willing to provide the necessary capital to a profitable use car dealership in order to launch operations.

For threats, one of the ongoing issues is the complicated regulatory environment regarding the sales of used vehicles as well as providing financing for them a qualified attorney should be hired in order to remedy any of these issues and ensure that the used car dealers operating within the letter of the lot all times. One of the other major threats faced by these businesses – is that there are usually a number of used car dealership as such, these businesses must find ways to effectively market from other competitors and in the market. This is commonly done by providing low-cost repairs on site.

Overall, the outlook for the used vehicle industry will remain strong given the need this type of motor transportation.

THANK YOU