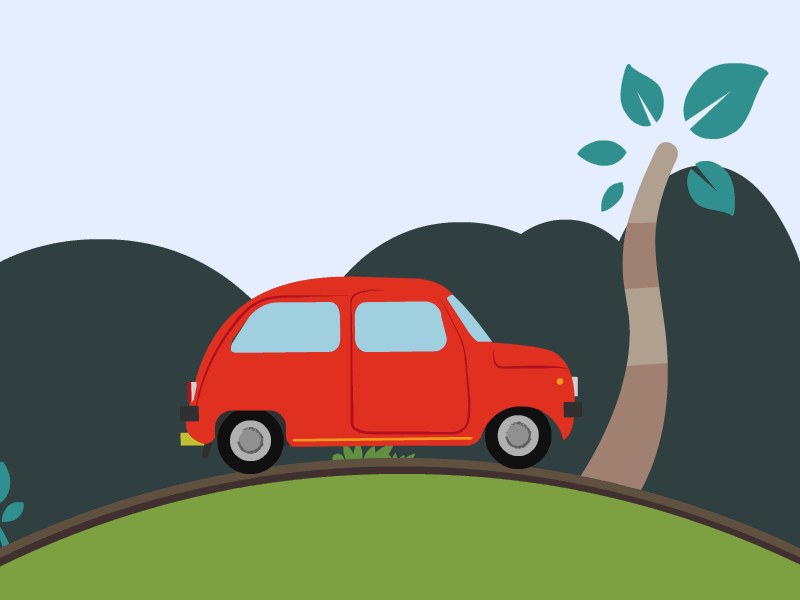
**car resale value prediction**

****

**Varshilkumar B Dhameliya**

**INDEX**

1. INTRODUCTION
   1. OVERVIEW
   2. PURPOSE
2. LITERATURE SURVEY
   1. Existing Problem
   2. Proposed solution
3. THEORITICAL ANALYISIS
   1. Block Diagram
   2. Hardware/Software Designing
4. EXPERIMENTAL INVESTIGATION
5. FLOWCHART
6. RESULT
7. ADVANTAGES AND DISADVANTAGES
8. APPLICATIONS
9. CONCLUSION

10. FUTURE SCOPE

**INTRODUCTION TO PROJECT**

Predicting the price of used cars in both an important and interesting problem.

According to data obtained from the National Transport Authority, the number of cars registered between 2003 and 2013 has witnessed a spectacular increase of 234%. From 68, 524 cars registered in 2003, this number has now reached 160, 701. With difficult economic conditions, it is likely that sales of second-hand imported (reconditioned) cars and used cars will increase. It is reported in that the sales of new cars has registered a decrease of 8% in 2013. In many developed countries, it is common to lease a car rather than buying it outright. A lease is a binding contract between a buyer and a seller (or a third party – usually a bank, insurance firm or other financial institutions) in which the buyer must pay fixed installments for a pre-defined number of months/years to the seller/financer.

After the lease period is over, the buyer has the possibility to buy the car at its residual value, i.e. its expected resale value. Thus, it is of commercial interest to seller/financers to be able to predict the salvage value (residual value) of cars with accuracy. If the residual value is under-estimated by the seller/financer at the beginning, the installments will be higher for the clients who will certainly then opt for another seller/financer. If the residual value is over-estimated, the installments will be lower for the clients but then the seller/financer may have much difficulty at selling these high-priced used cars at this over-estimated residual value. Thus, we can see that estimating the price of used cars is of very high commercial importance as well. Manufacturers’ from Germany made a loss of 1 billion Euros in their USA market because of miscalculating the residual value of leased cars. Most individuals in Mauritius who buy new cars are also very apprehensive about the resale value of their cars after certain number of years when they will possibly sell it in the used cars market.

Predicting the resale value of a car is not a simple task. It is trite knowledge that

the value of used cars depends on a number of factors. The most important ones are usually the age of the car, its make (and model), the origin of the car (the original country of the manufacturer), its mileage (the number of kilometers it has run) and its horsepower. Due to rising fuel prices, fuel economy is also of prime importance. Unfortunately, in practice, most people do not know exactly how much fuel their car consumes for each km driven. Other factors such as the type of fuel it uses, the interior style, the braking system, acceleration, the volume of its cylinders (measured in cc), safety index, its size, number of doors, paint color, weight of the car, consumer reviews, prestigious awards won by the car manufacturer, its physical state, whether it is a sports car, whether it has cruise control, whether it is automatic or manual transmission, whether it belonged to an individual or a company and other options such as air conditioner, sound system, power steering, cosmic wheels, GPS navigator all may influence the price as well. Some special factors which buyers attach importance in Mauritius is the local of previous owners, whether the car had been involved in serious accidents and whether it is a lady-driven car. The look and feel of the car certainly contributes a lot to the price. As we can see, the price depends on a large number of factors.

**LITERATURE SURVEY**

The prices of new cars in the industry are 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.

**Related work**

Surprisingly, work on estimated the price of used cars is very recent but also very

sparse. In her MSc thesis [3], Listiani showed that the regression mode build using

support vector machines (SVM) can estimate the residual price of leased cars with

higher accuracy than simple multiple regression or multivariate regression. SVM is better able to deal with very high dimensional data (number of features used to predict the price) and can avoid both over-fitting and under-fitting. In particular, she used a genetic algorithm to find the optimal parameters for SVM in less time. The only drawback of this study is that the improvement of SVM regression over simple regression was not expressed in simple measures like mean deviation or variance. In another university thesis, Richardson working on the hypothesis that car manufacturers are more willing to produce vehicles which do not depreciate rapidly.

In particular, by using a multiple regression analysis, he showed that hybrid cars (cars which use two different power sources to propel the car, i.e. they have both an internal combustion engine and an electric motor) are more able to keep their value than traditional vehicles. This is likely due to more environmental concerns about the climate and because of its higher fuel efficiency. The importance of other factors like age, mileage, make and MPG (miles per gallon) were also considered in this study. He collected all his data from various websites.

**THEORITICAL ANALYSIS**

In order to predict the resale value of the car, we proposed an intelligent, flexible, and effective system that is based on using regression algorithms. Considering the main factors which would affect the resale value of a vehicle a regression model is to be built that would give the nearest resale value of the vehicle. We will be using various regression algorithms and algorithm with the best accuracy will be taken as a solution, then it will be integrated to the web-based application where the user is notified with the status of his product. In this project, random forest is been used. The random forest is a classification algorithm consisting of many decision trees. It uses bagging and feature randomness when building each tree to try to create an uncorrelated forest of trees whose prediction by committee is more accurate than that of any individual tree.

**EXPERIMENTAL INVESTIGATION**

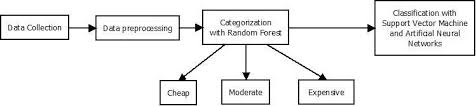
There are several Machine learning algorithms to be used depending on the data you are going to process such as images, sound, text, and numerical values. The algorithms can be chosen according to the objective. As the dataset which we are using is a REgression dataset so you can use the following algorithms

* Multi Linear Regression
* Random Forest Regression / Classification
* Decision Tree Regression / Classification
* K-Nearest Neighbors
* Support Vector Machine

The model which is been used here is random forest.

Random forests or random decision forests are an ensemble learning method for classification, regression and other tasks that operate by constructing a multitude of decision trees at training time and outputting the class that is the mode of the classes or mean/average prediction of the individual trees.

**FLOW CHART**



**ADVANTAGES AND DISADVANTAGES**

**Advantages:**

Can 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.

**APPLICATIONS**

* With difficult economic conditions, it is likely that sales of second-hand imported (reconditioned) cars and used cars will increase. In many developed countries, it is common to lease a car rather than buying it outright. After the lease period is over, the buyer has the possibility to buy the car at its residual value, i.e. its expected resale value. Thus, it is of commercial interest to sellers/financers to be able to predict the salvage value (residual value) of cars with accuracy.
* In order to predict the resale value of the car, we proposed an intelligent, flexible, and effective system that is based on using regression algorithms. Considering the main factors which would affect the resale value of a vehicle a regression model is to be built that would give the nearest resale value of the vehicle.

**RESULT AND CONCLUSION**

* In the given guided project I understood the problem to classify if it is a regression or a classification kind of problem.
* I also came to know how to pre-process the data using different data-preprocessing techniques
* Not only this, I also grasp the knowledge about applying different algorithms according to the dataset
* I also learn about the features of flask application

**FUTURE SCOPE**

By using deep learning the system can be made more proficient in predicting performance. Web application which is been made using flask can be improved in order to make it more user-friendly. As a result, people would use the web-application more and get the benefit from it before consuming cars. Apart from this, the feature which are been considered while making a prediction can be enlarge so that the accuracy level would boost-up.

**Video link:**

[**https://drive.google.com/file/d/13zgTaLEmFDTp3W9-nzhDZc6BJmQhy6Yo/view?usp=sharing**](https://drive.google.com/file/d/13zgTaLEmFDTp3W9-nzhDZc6BJmQhy6Yo/view?usp=sharing)