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Vehicle Price Prediction using SVM Techniques

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ABSTRACT: The prediction of price for a vehicle has been more popular in research area, and it needs predominant effort and information about the experts of this particular field. The number of different attributes is measured and also it has been considerable to predict the result in more reliable and accurate. To find the price of used vehicles a well defined model has been developed with the help of three machine learning techniques such as Artificial Neural Network, Support Vector Machine and Random Forest. These techniques were used not on the individual items but for the whole group of data items. This data group has been taken from some web portal and that same has been used for the prediction. The data must be collected using web scraper that was written in PHP programming language. Distinct machine learning algorithms of varying performances had been compared to get the best result of the given data set. The final prediction model was integrated into Java application.

KEYWORDS: Artificial neural network, Support vector machine, Random forest

I. INTRODUCTION

Predicting the price for new vehicles is more interesting and needed problem by many users. The data set has been collected in the year of 2014 from the statistics field says that 84 percent of vehicles had been bought for their own personal usage. Later this percent has been increased very much because people has more interested to buy new vehicles often and also showing more interest on finding the price of new vehicles. This increases the efficiency of prediction techniques. Only with the help of experts and their corresponding knowledge we can achieve more accurate prediction for vehicle price. So the varying prediction algorithms from machine learning suits this topic more efficiently. While predicting price of vehicles we need an entire different features and factors. The most significant feature is brand and model of vehicle and also the mileage plays the major role for predicting the price of vehicle. The most popular ingredient for vehicle is type of fuel and the volume of fuel in which it consumes for each mile. This particular data set might highly affect the price of a vehicle. And also we need to consider the price of fuel because it may changes frequently. Now we can consider for four wheelers also. Varying more features might require for four wheelers than two wheelers. The variety of features such as exterior color, door number, type of transmission, dimensions, safety, air condition, interior, whether it has navigation or not will also influence the vehicle price. In this paper, we applied different methods and techniques in order to achieve higher precision of the used vehicle price prediction.

II. LITERATURE SURVEY

According to author Sameerchand, they have done the predictions of vehicle price from the historical data that has been collected from daily newspapers. They have used the supervised machine learning techniques for predicting the price of vehicles. Many other algorithms such as multiple linear regression, k- nearest neighbor algorithms, naïve based, and some decision tree algorithms also been used. All the four algorithms are compared and found the best algorithm for prediction. They have faced some difficulties in comparing the algorithms, somehow they have managed.

According to authors Pattabiraman, this paper is more concentrated on the relation between seller and buyer. In order to predict the price of four wheelers, more features are required such as already given price, mileage,

make, model, trim, type, cylinder, liter, doors, cruise, sound, leather. Using these features the price of vehicle has been predicted with the help of statistical analysis system for exploratory data analysis.

According to authors Enis Gegic et al, in this paper the mainly concentrate on collecting various data from web portal by using web scrap techniques. And those have been compared with the help of different machine learning algorithms to predict the vehicle price in easy manner. They classified the price according to different ranges of price that is already given. Artificial neural network, support vector machine, random forest algorithms were used on different datasets to build classifiers model.

Another approach was given by Richardson in his thesis work. In his theory it states more durable vehicles will be produced by vehicle producer. He compared the hybrid vehicles and traditional vehicles in hoe it actually retains their value for longer time using multiple regression techniques. This improves the environmental conditions, and also it helps to provide huge efficiency of using fuels.

Wu et al, in this paper they have used neuro fuzzy knowledge based system to demonstrate vehicle price prediction. By considering the following attributes such as brand, year of production and type of engine they predicted a model which has similar results as the simple regression model. Moreover, they made an expert system named ODAV (Optimal Distribution of Auction Vehicles) as there is a high demand for selling the by vehicles at the end of the leasing year by vehicle dealers. This system gives insights into the best prices for vehicles, as well as the location where the best price can be gained. To predict a price of vehicles, the K – nearest neighbor machine learning algorithm has been used which is based on regression models. More number of vehicles has been exchanged through this system so this particular system is more successfully managed.

III. EXISTING SYSTEM

In the existing system, to predict the price of vehicles both two wheeler and four wheeler, a lot of data mining algorithms and machine learning algorithms were widely used. The major drawback of this existing system is they need more attributes in order to predict the vehicle price. More comparison techniques must be used to get the result more efficiently. It is highly complicated to get sufficient data sets that were spread widely all over the world. The datasets can be collected only through online. But not on the offline mode. It is not possible for everyone to collect the data sets through online mode particularly in rural areas. The data sets will not have about the vehicles which were not used for long time and also the traditional model vehicles may or may not be included in the data sets. The major drawbacks of existing system is The system is very slow due to most of the works about the keyword query just analyze individual points, and they are inappropriate to many applications that call for analysis of groups of different vehicle points. There are no fast query retrieval methods and is low due to lack of SVM under Constraints.

IV. PROPOSED SYSTEM

Based on the varying features and factors, and also with the help of experts knowledge the vehicle price prediction has been done accurately. The most necessity ingredient for prediction is brand and model, period usage of vehicle, mileage of vehicle. The fuel type used in the vehicle as well as fuel consumption per mile highly affect price of a vehicle due to a frequent changes in the price of a fuel. Different features like exterior color, door number, type of transmission, dimensions, safety, air condition, interior, whether it has navigation or not will also influence the vehicle price. In this paper, we applied different methods and techniques in order to achieve higher precision of the used vehicle price prediction.

Advantages

- The system is more effective since it measures the vehicle combinations by their prices.
- The system is very fast in query retrieval due to SVM Algorithm.

V. ACTUAL WORK DESIGN WORK

Input Design plays a vital role in the life cycle of software development. The attention of developers is required to collect the information about vehicles. The most accurate data must be entered in the input design. The design of input is more important in minimizing the errors that has been given by the user. By the rules of software engineering concepts, the validation control must be defined over the input limit in the input forms or screens. The validation control must take care of other input related errors. The input screens have been included in almost all

the modules. The alert message will be displayed whenever user did any mistakes while giving input. And also some messages will be provided in order to guide the user in correct way. By this we can achieve to get only valid details. The user created input has been converted in to computer related format. The input design is based on data entry logical. The main goal of input design is to make the errors in the input form. The created application should be user-friendly manner. Wherever the cursor is placed in processing the input must be entered in that same place. By this way the form has been designed. There might be several options for a single input so that the user has to select suited input to get the best result. Each entered data must be validated accordingly. The error message must be displayed whenever the user enters any wrong data or irrelevant data as input. Even the user is in last page of input if he did not get the result properly then he can go to the first page and he can change the input given already.

The primary output form has been created in order to get communication between the administrator and the clients. The VPN system produces output in the form of managing clients by the project leaders, in a way such as creating new clients, allotting new projects to them, have a look over table in which to get the details about project status, and the same will be accessed by each clients. A new project will be assigned to every client when he completes his old project. At every initial stage of the new project, the user authentication should be maintained. A user registration can be done either by the administrator or the user can do by himself. But only the administrator must have the authority to assign the projects to each user.

When the application is executed it starts running. The used browser is internet explorer and the server will start its process. The project will run on the local area network so the server machine will serve as the administrator while the other connected systems can act as the clients.

Implementation modules

|| Seller

In this module, the login has done by the seller by using valid user name and password. After login successful he can perform some operations such as View All Authorized Users, Add Category, Add Sub Category, Add Vehicles, View All Uploaded vehicles, View Purchased Vehicles, View Search Transactions, View All Vehicle Reviews, View Vehicle Score Result, View keyword Score Result.

|| Viewing and Authorizing Users

In this module, the Server can view all user details and authorization can be done them for login permission. User Details includes User Name, Address, Email Id and Mobile Number in the corresponding login page.

|| Adding Categories and vehicles

In this module, the admin adds Categories and Vehicles with details such as Category Name, Vehicle Name, Description and Vehicle Image.

|| List all Vehicles with Ratings

In this module, the admin can list his entire added Product with details along with rating. The ratings are calculated based on number of recommendations made on particular vehicle.

|| List all User's Vehicle Search History

In this, the administrator can view all user's Vehicle search history details.

|| User

In this module, there are n numbers of users can register. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password that has been sent to user. Once Login is successful user can perform some operations like My Profile, Create Online Bank Account, Search Optimal Products, Search top Products, and View Search History.

|| Viewing Profile Details

In this module, the user can see their own profile details, such as their address, email, mobile number, profile Image.

|| Search Vehicles

In this, the user can Search vehicle based on brand and model, age, vehicle price, mileage. In My Profile, the user can Create Online Bank Account and also can View Search History.

VI. RESULTS AND DISCUSSIONS

This section explains about various results and descriptions and comparisons made.



Fig 1. User login

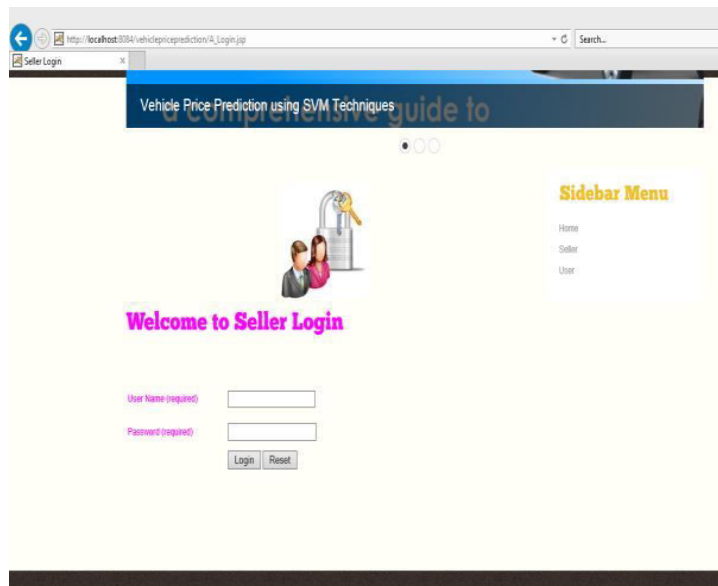


Fig 2. Seller login

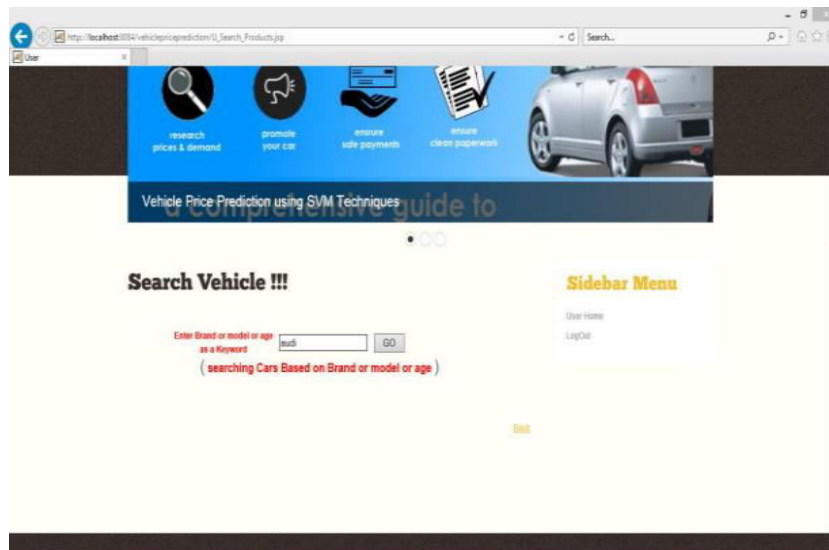


Fig 3. Search vehicle

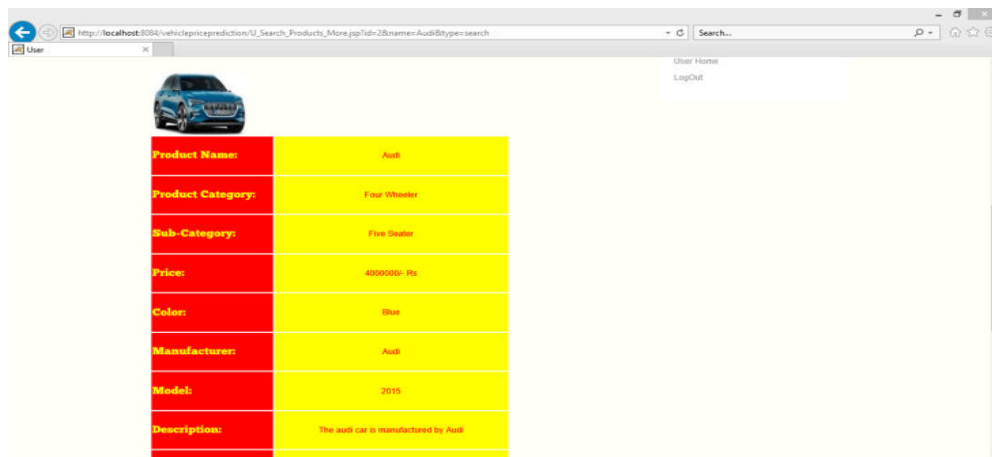


Fig 4. Price prediction

The above figure 1 and 2 shows that login page independently for user and seller. If the user or seller give the erroneous data further work will not be proceed. The figure 3 shows that in order to search vehicles either two wheeler or four wheelerThe figure 4 shows that the following attributes such as product name, product category, sub category, price, color, manufacturer, model, description and their corresponding results for the user.

VII.CONCLUSION

Vehicle price prediction can be a challenging task due to the more number of attributes that should be considered for the accurate prediction. The collection and preprocessing of data is the major step in prediction. In this paper, to normalize, standardize and to clean the data, PHP scripts were built. This will used to avoid unnecessary noise for machine learning algorithms. The prediction performance must be increased by using data cleaning processes. But in this paper, the insufficient set of complex data is the drawback here. We will get only 50 percent result on applying the single machine algorithm. Therefore, we proposed multiple groups of machine learning algorithm to gain more accuracy and it achieved 93 percent of efficiency. This comparison of single and multiple groups of machine learning algorithm is significant. And also it overcome the drawback of single machine algorithm which is given in proposed system. Although, this system has achieved valuable performance in vehicle price prediction, our aim for the future work is to test this system to work successfully with various data sets.



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