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Used Car Price Prediction Using Machine Learning

Adnan Patanwala[1], Qusai Jetpurwala[2], Huzefa[3], Burhan Rampurawala Polaiwala[4], Ms. Swati Nadkarni[5], Ms. Theres Bemila[6]

Students, Department of Information Technology, Shah and Anchor Kutchhi Engineering College, Mumbai, Maharashtra, India[1,2,3,4]

Head of the Department, Department of Information Technology, Shah and Anchor Kutchhi Engineering College, Mumbai, Maharashtra, India[5]

Assistant Professor, Department of Information Technology, Shah and Anchor Kutchhi Engineering College, Mumbai, Maharashtra, India[6]

ABSTRACT: Within the auto industry, the utilized car showcase is growing quickly and both buyers and venders ought to appraise the esteem of utilized cars. This ponder presents a machine learning strategy to foresee vehicle costs utilizing relapse and learning calculations. The demonstration is prepared on information containing data around different viewpoints of utilized cars such as year, mileage and other characteristics.This application can anticipate the cost of utilized cars with great precision, making it valuable for buyers and venders.

KEYWORDS: Used cars, Automobile, Prediction, Price

I. INTRODUCTION

The presentation to the article highlights the significance of assessing utilized car costs for venders and buyers. It moreover analyzes the developing request within the car industry and the utilize of machine learning calculations within the car industry. This segment gives particular setting for the ponder and shapes the premise for the rest of the article.

II. PROPOSED SYSTEM

As depicted in the figure below (fig 1), the process begins with collecting the dataset, followed by data preprocessing that involves data cleaning, data reduction, and data transformation. Various machine learning algorithms, such as Linear Regression, Ridge Regression, and Lasso Regression, are used to predict the price. The best model with the highest accuracy is selected, and the predicted price is displayed to the user based on their inputs. Users can give their inputs through the website for the used car price prediction by the machine learning model. Linear Regression is one of the algorithms used, which tries to establish a relationship between two variables by fitting a linear equation to the observed data, where one variable is considered to be the dependent variable, and the other variable is independent. For example, a modeler may want to relate the heights and weights of individuals using a linear regression model.

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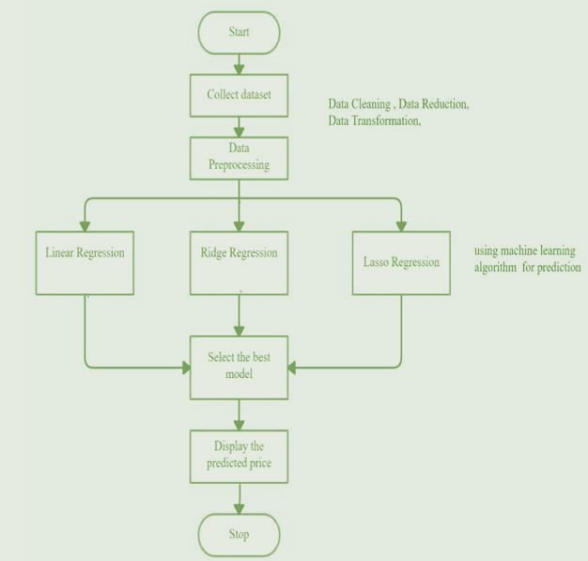

Figure 1: Proposed System Flowchart

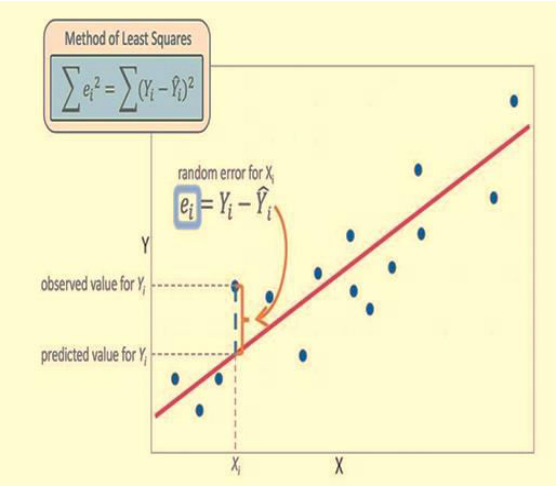

Figure 2: Linear Regression

Linear regression is a suitable method for discovering the correlation between various continuous variables. It is suitable for situations where there are multiple independent variables or a single independent variable.

y = m1X1+m2X2+……+b
m1, m2, m3 Slope
B intercept y
X1, X2, X3… independent variables
Y. .. dependent variables.

III. METHODOLOGY

For this project, we will obtain the dataset from online used car marketplaces, which will comprise features like make, model, year, mileage, fuel type, engine size, transmission, and price of the vehicle. The dataset will undergo preprocessing to convert it into an appropriate format for machine learning algorithms.Multiple machine learning algorithms will be explored, including linear regression, decision trees, random forests, and neural networks. The preprocessed dataset will be used to train these algorithms, and their performance will be evaluated using various metrics, such as R-squared, mean squared error, and cross-validation. To enhance the algorithm's performance, we will

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implement feature selection and engineering techniques. Techniques like Lasso Regression and Principal Component Analysis (PCA) will be used to select the most significant features and reduce the dataset's dimensionality.

I. Data Collection

The area on information collection within the content clearly appears how the creators obtained the information utilized within the think about. It moreover appears how information has been preprocessed to evacuate lost and suspicious information. This segment moreover handles normalization to guarantee that all properties are ordinary. In doing so, this segment provides a clear understanding of the information utilized within the think about and the method utilized to guarantee its exactness.

II. Data Features

The information should describe the features contained in the information, including the vehicle's make, display, year, mileage, area, and other interests that may affect its removal. It is important to know exactly how these elements are sel ected and their importance in assessing the value of the car.

III. Featured Engineering

Data ought to be given on how to alter, coordinated, or build the data to make strides the execution of the demonstrate. It ought to be specified that comparable procedures in machine learning, such as scaling, one-time coding, and highlight extraction, can increment the prescient control of the show.

IV. Model Evaluation

It is crucial to explain how the model's efficacy was appraised by utilizing suitable metrics like mean squared error (MSE), mean absolute error (MAE), root mean squared error (RMSE), and coefficient of determination (R-squared). Additionally, the paper should compare the performance of various machine learning algorithms employed in the study.

V. Hyperparameter

The article should explain how to tune hyperparameters to optimize the model. Hyperparameters are configurations of the machine learning algorithm that are not learned during training and can be correlated with the accuracy of the model.

VI. Application

Research papers should address the model's impact, such as its ability to help buyers and sellers in the used car industry make decisions. In addition, it should indicate the problems that may arise in the use of the model in the real world and suggest solutions to these problems. By including these points in this article, the reader can better understand the data, methodology and results of the study, as well as the positive implications of the model in the used car industry.

VII. Limitation

It is crucial to acknowledge the study's limitations, including but not limited to, data bias, model overfitting, and generalizability.

VIII. Interdisciplinary Applications

Moreover, the paper could explore the interdisciplinary potential of the research by discussing how the methods and findings could be adapted and applied to other fields beyond the automotive industry. For instance, the techniques used in the study could be useful for predicting the value of real estate properties or estimating insurance premiums. This broader perspective can enrich the paper's contributions and stimulate further research on related topics.

IX. Model Interpretability

A critical component of the paper is explaining how the model's predictions can be interpreted and understood. Various techniques can aid in this, including feature importance, partial dependence plots, and SHAP values. These methods can provide insights into how each feature impacts the model's predictions, enabling readers to gain a better understanding of the model's decision-making process.

IV. RESULTS

The conclusion segment presents the discoveries of the think about. Agreeing to the creators, their models can anticipate the esteem of utilized cars with great precision. The model's cruel square blunder (MSE) is 98789, which implies that the assess varies from the genuine cost by an normal of $9,894. In expansion, the coefficient of assurance

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(R-squared) is huge, meaning the demonstrate can explain 84% of the change within the information. This segment gives a coordinate understanding of the model's control and capacity to precisely degree the esteem of utilized cars.

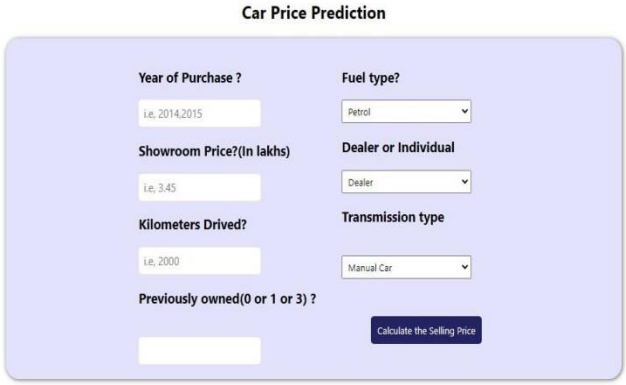

Figure3: DashBoard

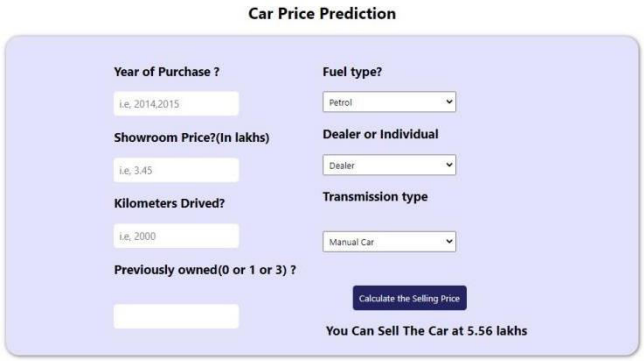

Figure4:Predicted Price

V. CONCLUSION

The conclusion section of the research paper summarizes the study's findings and their significance. This emphasize the model's usefulness for buyers and sellers in the used car market. The conclusion also acknowledges the potential for future research in this area and discusses the study's limitations. This section offers a comprehensive understanding of the study's contributions and its implications for future research.

In general, the research paper on used car price prediction using machine learning provides a thorough account of the data collection, model building, and results of the study. The paper underscores the importance of accurately predicting the price of a used car and the potential for machine learning algorithms to enhance this process. The paper's well-organized structure and detailed explanations make it easy to follow and offer valuable insights for both researchers and practitioners in the automotive industry

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