IARJSET

ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 7, July 2024

DOI: 10.17148/IARJSET.2024.11767

Using AI and Neuronal Networks with Machine Learning Tools to Forecast Old Car price

Bharath Mallikarjuna[1], K Sharath[2]

Student, Department of MCA, Bangalore Institute of Technology, Karnataka, India[1]

Assistant Professor, Department of MCA, Bangalore Institute of Technology, Karnataka, India[2]

Abstract: Predicting used car prices is a complex task that involves considering several key factors, such as the year, make, model, mileage, condition, and market trends. Accurate prediction models are essential for dealerships, sellers, and consumers to make informed decisions. This study aims to explore how artificial intelligence (AI) and neural networks can be utilized to forecast the prices of secondhand cars. Our goal is to develop a practical model for used car valuation using machine learning techniques. Our methodology includes data collection, preprocessing, feature selection, and training using advanced neural network architectures. The model's accuracy will be evaluated using metrics such as mean absolute error (MAE) and root mean square error (RMSE). Ultimately, the aim is to showcase the capabilities of AI in this domain.

Keywords: Artificial Intelligence, Neural Networks, Machine Learning, Old Car Price Forecasting Predictive Modeling, Data Preprocessing Feature Engineering, Mean Absolute Error, Automotive Market.

I. INTRODUCTION

The automotive market is always changing, with used car prices affected by economic conditions, technological advancements, and consumer preferences. Accurately predicting these prices is essential for both buyers and sellers to make informed decisions. Traditional pricing methods often depend on linear models and expert knowledge, which may not fully capture the complexities of the data. However, the rise of Artificial Intelligence (AI) and Machine Learning, especially neural networks, allows for the development of more sophisticated models to handle this task. This research project aims to leverage the Power of AI and neural networks to accurately forecast used car prices. A comprehensive dataset of used cars will be collected, including attributes such as make, model, year, mileage, and condition. The data will undergo preprocessing steps, including Cleaning, Normalization, and feature engineering, to ensure its suitabilitys for training the model.

The neural network model will be designed to examine historical data and detect patterns influencing car prices. By training this model, we aim to develop a predictive tool that can deliver accurate price estimates for used cars. The model's effectiveness will be assessed using metrics like mean absolute error (MAE) and root mean square error (RMSE), and the outcomes will be compared to traditional forecasting methods to showcase the benefits of using AI and neural networks.

II. LITERATURE SURVEY

The literature review should cover the existing studies, methods, and technologies used in forecasting old car prices using AI, neural network models, and machine learning tools.

Historical Pricing Models:

Traditional methods of car price estimation, such as depreciation models and hedonic pricing models.
Traditional models often face limitations when it comes to capturing the intricate nature of car pricing.

Machine Learning Approaches:
Decision Trees are flexible algorithms suitable for both classification and regression tasks. They build a tree-like model to make predictions based on input features. To enhance prediction accuracy, ensemble techniques like random forests combine multiple Decision Trees. This comparison involves examining supervised versus unsupervised learning methods in the realm of price prediction.

© IARJSET This work is licensed under a Creative Commons Attribution 4.0 International License

IARJSET
ISSN (O) 2393-8021, ISSN (P) 2394-1588
International Advanced Research Journal in Science, Engineering and Technology
Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 7, July 2024
DOI: 10.17148/IARJSET.2024.11767

Neural Networks and Deep Learning:
Neural networks, a key element of deep learning, include various structures such as feedforward neural networks, convolutional neural networks (CNNs), and recurrent neural networks (RNNs). These architectures are tailored to handle and analyze intricate data, making them essential for diverse applications.

AI and Advanced Techniques:
AI techniques, including reinforcement learning and transfer learning, have been Utilized in price forecasting. Recent advancements in AI can be leveraged for more Accurate price predictions.

Datasets and Features:
Common datasets used in car price prediction research.Key features influencing car prices, such as make, model, year, mileage, condition, location, and market trends.

III. EXISTING SYSTEM

The existing system section should describe the current methods and technologies used for forecasting old car prices, including their strength and weaknesses.

Existing methods for predicting used car prices mostly depend on linear regression and statistical techniques, analyzing historical sales data like make, model, year, mileage, and condition. However, these approaches frequently struggle to capture the intricate and non-linear relationships between variables, resulting in less precise predictions.

Conventional regression models typically assume a linear relationship between dependent and independent variables, an assumption that seldom reflects real-world conditions.

These models also face significant challenges in processing large volumes of data and integrating unstructured data sources such as reviews of customers and trending market. Furthermore, their accuracy is highly dependent on the quality and completeness of input data, making them susceptible to issues arising from missing or noisy data.

Key Points to Include:

Traditional Valuation Tools:
Kelley Blue Book, Edmunds, and other traditional car valuation tools.
Strengths: Widely used, established reputation. Weaknesses: Limited adaptability, reliance on historical data, less personalized predictions.

Online Platforms:
CarGurus, TrueCar, and other online marketplaces with built-in price prediction models.
Strengths: Real-time data, user-friendly interfaces. Weaknesses: Proprietary algorithms, lack of transparency, potential bias in pricing.

Current AI and ML Models:
Existing AI and ML models used by companies and researchers.
Strengths: Ability to handle large datasets, improved accuracy over traditional methods.
Weaknesses: Challenges include complexity, significant computational demands, and the necessity for extensive training data.

IV. PROPOSED SYSTEM

In the proposed system section, we outline our innovative method for predicting classic car prices by leveraging Artificial Intelligence, Neural Networks, and machine learning techniques.

The proposed system is designed to utilize Artificial Intelligence and neural-networks to-enhance the precision and dependability of price predictions for used cars. This system will adopt a deep- learning strategy that integrates a Convolutional Neural-Network (CNN) with a Recurrent Neural-Network (RNN) to effectively capture both spatial and temporal relationships in the datas. The CNN will focus on extracting features by identifying complex patterns in input data, such-as car images, while the RNN will process sequential data, including time-series information about market trends.

© IARJSET This work is licensed under a Creative Commons Attribution 4.0 International License

IARJSET
ISSN (O) 2393-8021, ISSN (P) 2394-1588
International Advanced Research Journal in Science, Engineering and Technology
Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 7, July 2024
DOI: 10.17148/IARJSET.2024.11767

To improve predictions and minimize errors, the hybrid model-will be augmented with a Gradient Boosting Machine (GBM).

Furthermore, the system will incorporate natural-language processing (NLP) techniques to examine unstructured data from customer reviews and market reports, offering a holistic perspective on the factor that affect car prices.

Key Points to Include:

System Architecture:

The proposed system architecture consists of several key stage, including data collections, preprocessing, feature selection, model training, and prediction. This outline encompasses the necessary steps to develop an effective and accurate model for forecasting old car prices.

Model Selection:

Selection of neural network architectures (such as CNN, RNN, LSTM) and the reasoning for choosing them.Integration of AI techniques such as reinforcement learning or transfer learning.

Data Sources:

Description of the data sources, including historical car prices, market trends, and other relevant datasets.
Methods for augmenting data to improves the dataset.

Feature Engineering:

Essential features for the model, such as vehicle characteristics, market trends, and economic factors. Techniques for feature extraction and selection.

Training and Validation:

Methods for training the neural network models, including hyperparameter tuning and cross-validation. Strategies for validating the model performance, such as train-test split evaluation metrics.

V. IMPLEMENTATION

The proposed system will be implemented in several stages, start with data collections and preprocessing. Historical data on car sales will be gathered from various-sources, including key attributes such as make, model, year, mileage, and condition. Additionally, unstructured data from customer reviews and market reports will be collected and processed using-natural-language-processing (NLP) techniques to extract valuable insights.

Feature extraction will employ Convolutional Neural Networks (CNNs) to identify intricate patterns in car images. To streamline data processing, dimensionality reduction methods like Principal Component Analysis (PCA) and autoencoders will be used. Additionally, Recurrent Neural Networks (RNNs) will be applied to manage sequential data, such as time-series information on market trends.

The hybrid model will be constructed by combining the CNN and RNN components. A Gradient Boosting Machine (GBM) will be integrated to refine predictions and reduce errors. The model will be trained and validated using a diverse dataset to ensure its ability to handle various makes, models, and conditions of old cars.

Fig. HomePage

IARJSET
ISSN (O) 2393-8021, ISSN (P) 2394-1588
International Advanced Research Journal in Science, Engineering and Technology
Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 7, July 2024
DOI: 10.17148/IARJSET.2024.11767

To enable real-time predictions, the systems will be deployed on a cloud-based platform, leveraging its computational-power and scalability. A user-friendly interface will be implemented to allow users to input data and receive price forecasts quickly and easily. This data will encompass key attributes such as make, model, year, mileage, and condition, supplemented by unstructured data from customer reviews and market reports, processed with natural-language processing (NLP) techniques to extract insightful information. Feature extraction will leverage Convolutional-Neural-Networks (CNNs) to detect intricate patterns in car images, while dimensionality-reduction-methods like Principal Component Analysis (PCA) and autoencoders will streamline data processing. Recurrent-Neural-Networks (RNNs) will be employed to manage sequential data, particularly time-series information reflecting market trends. A hybrid model combining CNN and RNN components will be developed, with a Gradient Boosting Machine (GBM) integrated to enhance prediction accuracy and minimize errors. The model will undergo rigorous training and validation on a diverse dataset to ensure robustness across various makes, models, and conditions of used cars. For real-time prediction capabilities, the system will be deployed on a cloud-based platform, capitalizing on its computational-power and scalability. A user-friendly interface will facilitate easy data input and prompt price forecasts for users.

VI. RESULT

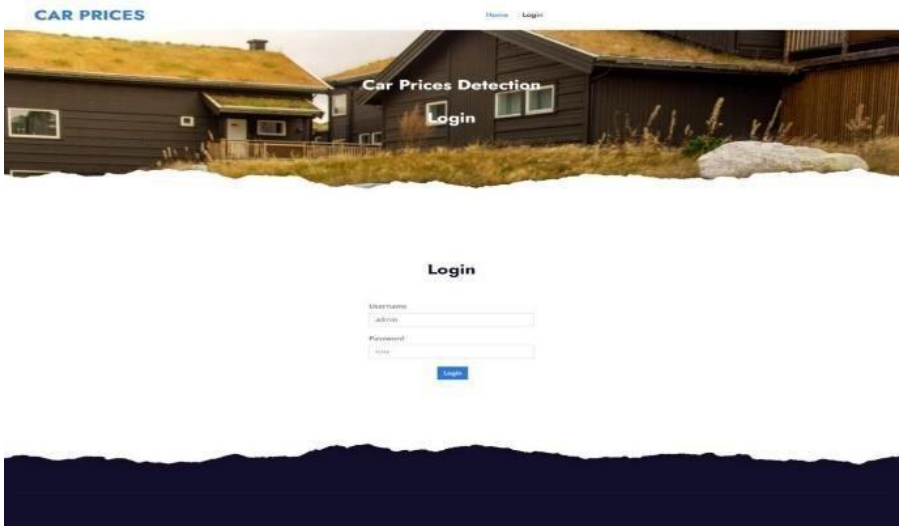

Fig. LoginPage

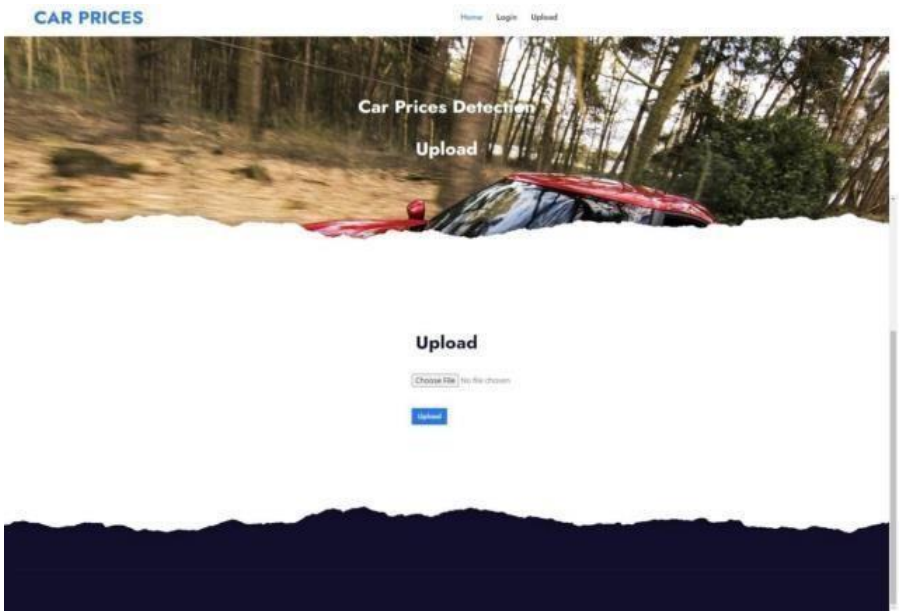

Fig. Upload Page

IARJSET

ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 7, July 2024

DOI: 10.17148/IARJSET.2024.11767

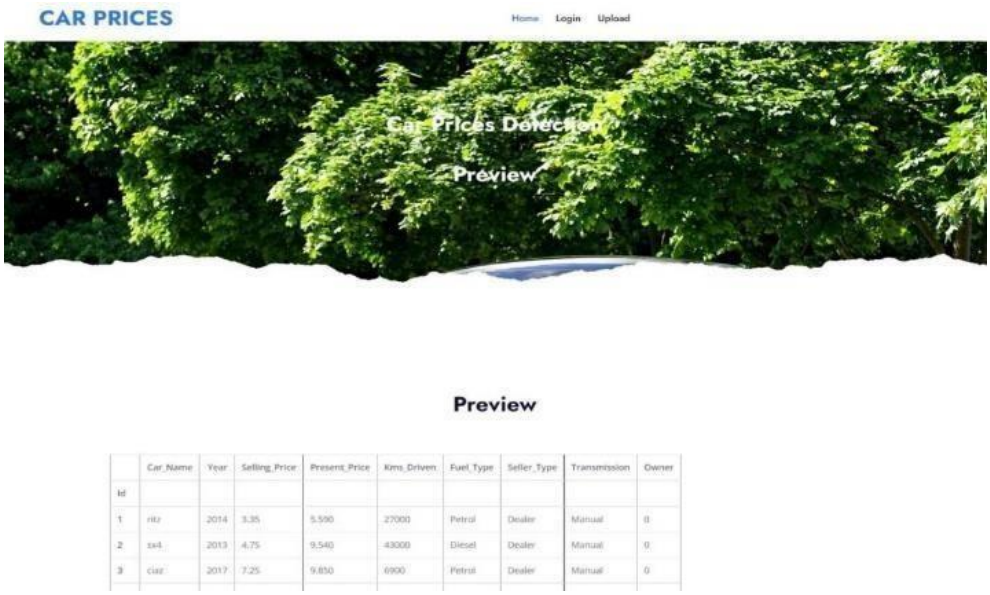

Fig. Preview Page

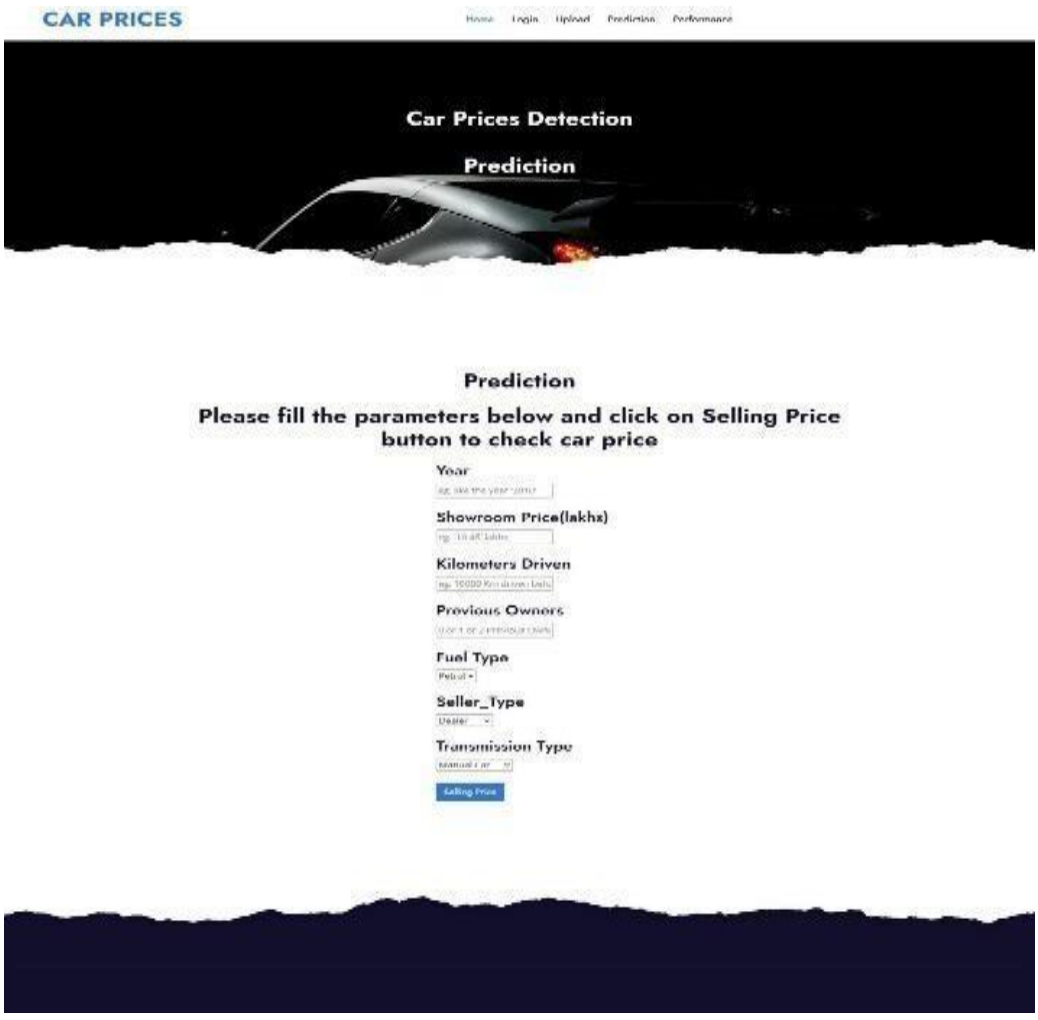

Fig. Prediction Page

IARJSET

ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 7, July 2024

DOI: 10.17148/IARJSET.2024.11767

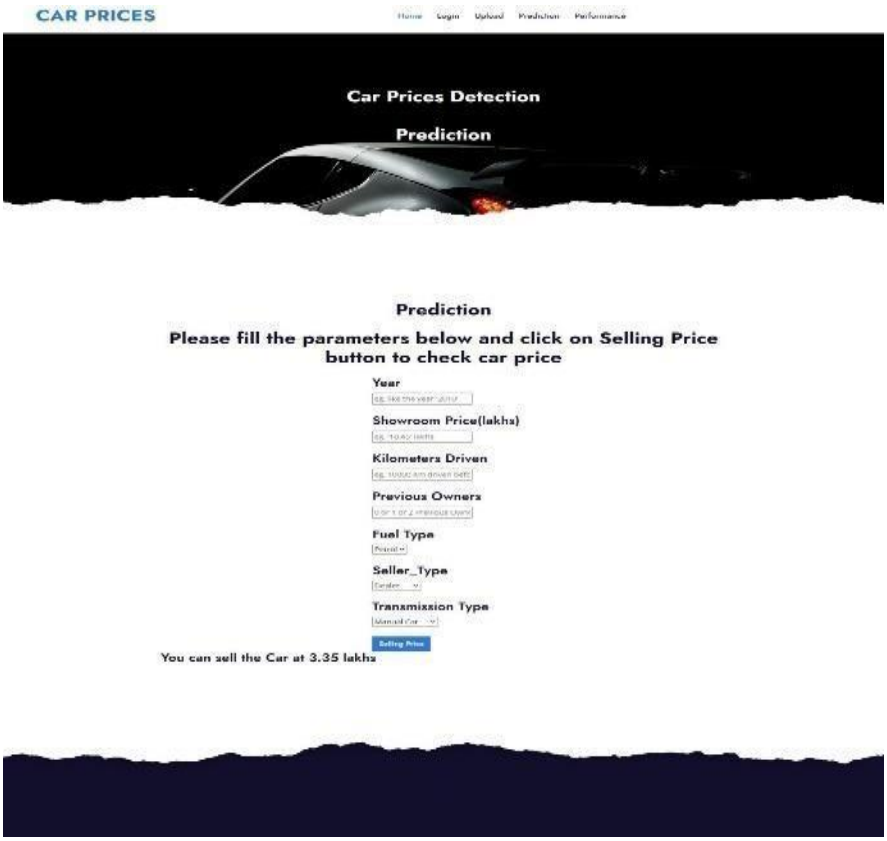

Fig. CAR PRICE AT 3.35 LAKH

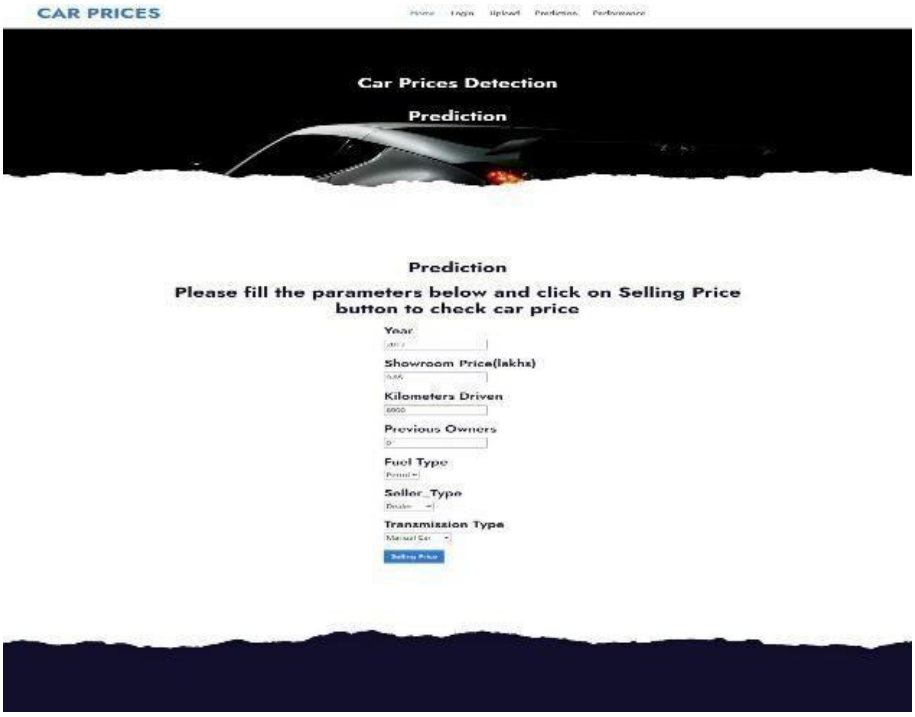

Fig. Again Prediction Page

© IARJSET This work is licensed under a Creative Commons Attribution 4.0 International License

IARJSET

ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 7, July 2024

DOI: 10.17148/IARJSET.2024.11767

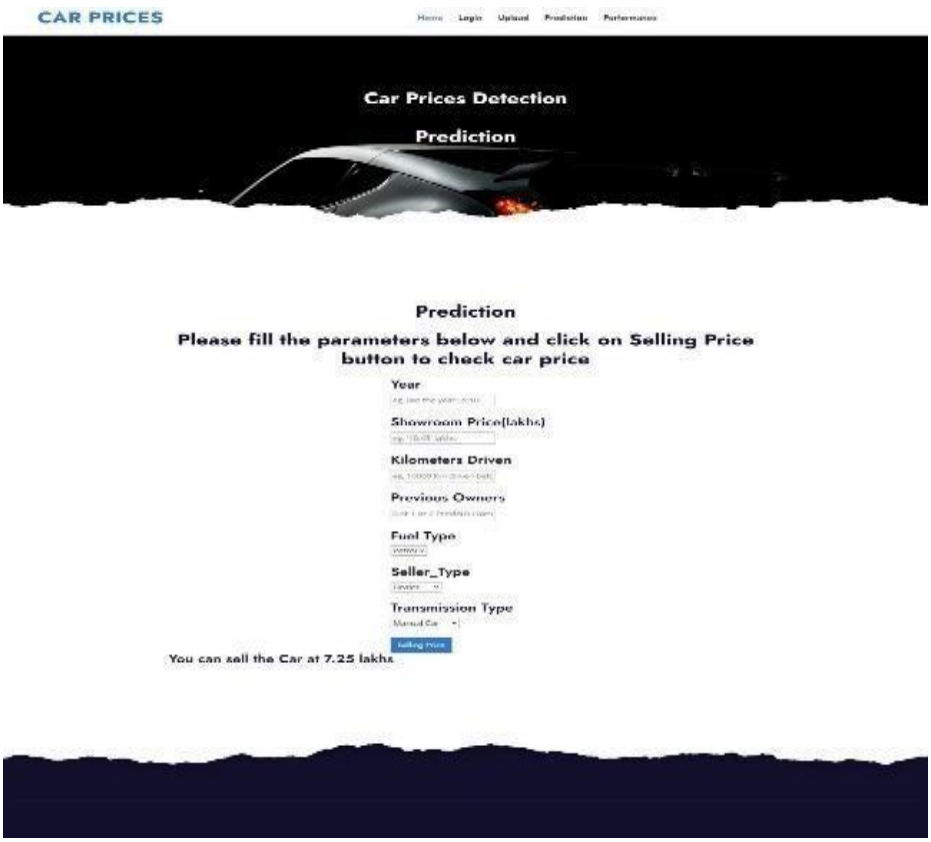

Fig. Car Price at 7.25 lakh

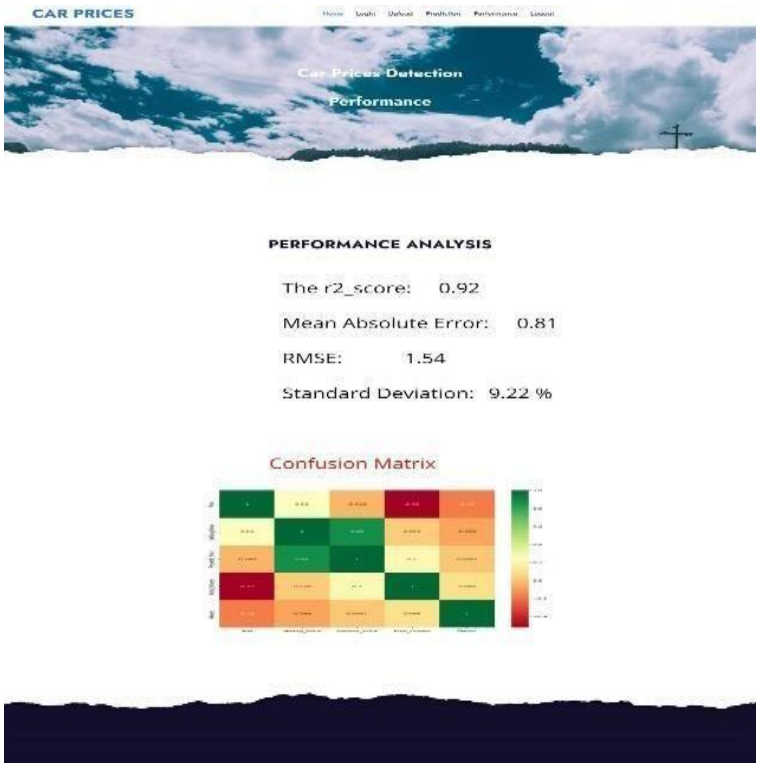

Fig. Performance Analysis

© IARJSET This work is licensed under a Creative Commons Attribution 4.0 International License

IARJSET

ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 7, July 2024

DOI: 10.17148/IARJSET.2024.11767

VII. CONCLUSION

In conclusion, the global useds automobile-market is expanding as new car costs rise and consumers' capacity to buy them is hampered by budgetary restraints. Thus, a reliable technique for predicting the price of used-car that takes into account a variety of criteria is desperately needed.Predicting the price of-used automobiles requires a great deal of caution and in-depth knowledge of cars and their models. The performance examination of our suggested approach, which incorporated a Decision-Tree-Regressor, produced accurate predictions of used car pricing. Training set: 1.0; test set: 0.916727846049827; tree score:
0.916727.

VIII. FUTURE ENHANCEMENTS

While this model is tailored for predicting used car prices, it can also be adapted for forecasting the prices of electronic devices or household appliances. By integrating the model with real-time data sources and employing reinforcement learning, it can continually update and refine its predictions based on dynamic datasets.

The model can be extended to get trained on clusters of data rather than on a small dataset. The model's accuracy can be improved by utilizing extensive historical data. It can be deployed on the web through APIs (Application Programming Interfaces) such as Heroku, REST, Git, and others.

REFERENCES

[1]. Peerun, Saamiyah & Chummun, Nushrah & Pudaruth, Sameerchand. (2015). Predicting the Price of Second-hand Cars using Artificial Neural Networks.

[2]. Pandey, Abhishek and Rastogi, Vanshika and Singh, Sanika, Car's Selling Price Prediction using Random Forest Machine Learning Algorithm (March 1, 2020). 5th International Conference on Next Generation Computing Technologies (NGCT-2019), Available at SSRN: https://ssrn.com/abstract=3702236 or http://dx.doi.org/10.2139/ssrn.3702236.

[3]. Ganesh, Mukkesh & Venkatasubbu, Pattabiraman. (2019). Used Cars Price Prediction using Supervised Learning Techniques. International Journal of Engineering and Advanced Technology. 9. 216-223.10.35940/ijeat.A1042.1291S319

[4]. Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-5 |Issue-4June 2021,

[5]. N. Monburinon, P. Chertchom, T. Kaewkiriya,S. Rungpheung, S. Buya, and P. Boonpou presented their research on "Predicting Used Car Prices Using Regression Models" at the 2018 5th International Conference on Business and Industrial Research.

[6]. N. Sun, H. Bai, Y. Geng, and H. Shi presented a paper titled "Price Evaluation Model in Secondhand Car System Based on BP Neural Network Theory" at the 2017 18th IEEE/ACIS International Conference on Software Engineering, Artificial Intelligence, Networking, and Parallel/Distributed Computing (SNPD). The paper, published in 2017 on pages 431-436, is accessible via DOI: 10.1109/SNPD.2017.8022758.

[7]. C. V. Narayana, C. L. Likhitha, S. Bademiya and K. Kusumanjali, "Machine Learning Techniques To Predict The Price Of Used Cars: Predictive Analytics in Retail Business," 2021 The Second International Conference on Electronics and Sustainable Communication Systems (ICESC), 2021, pp. 1680-1687.

[8]. The paper "Vehicle Price Prediction Using SVM Techniques" by S.E. Viswapriya, Durbaka Sai Sandeep Sharma, and Gandavarapu Sathya Kiran, published in the International Journal of Innovative Technology and Exploring Engineering (IJITEE), Volume 9, Issue 8, June 2020, ISSN: 2278-3075, discusses the application of SVM methods for forecasting vehicle prices.

© IARJSET This work is licensed under a Creative Commons Attribution 4.0 International License