Smart Service and Price Prediction

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ABSTRACT-The online car service booking system has gained significant popularity in recent years due to its convenience and efficiency. This project aim is to develop a comprehensive system that enables users to book car services online and predicts the price of used cars based on available data. The system utilizes a dataset that contains information about various car service centers, including their locations and services offered. By leveraging this dataset, the system can recommend the nearest service provider based on the user's location, ensuring timely and convenient service booking. Furthermore, the system incorporates a machine learning model trained on a separate dataset of used car prices. This model takes into account factors such as car make, model, year, mileage, and condition to predict the approximate price of a used car. Users can input the relevant information about their car, and the system will provide an estimated price range based on the trained model. The implementation of the system involves developing a user-friendly web interface that allows users to input their location, select desired services, and view the estimated prices for their used cars.

Keywords – Online Service Booking, Nearest Service Provider, Desired Service, Price Prediction, Trained model.

1. INTRODUCTION

The automotive industry has witnessed significant advancements in recent years, with the emergence of online platforms revolutionizing the way car services are booked and used car prices are predicted. Online car service booking systems offer a convenient and efficient solution for users to schedule their vehicle maintenance and repairs without the hassle of traditional phone calls or in-person visits. Additionally, predicting the price of used cars has become essential for buyers and sellers to make informed decisions and negotiate fair transactions.

This project focuses on the development of an online car service booking system that not only allows users to book services conveniently but also recommends the nearest mechanic shop based on their location. Furthermore, the system incorporates a machine learning model trained on a dataset of used car prices, enabling users to obtain estimated price ranges for their vehicles based on relevant attributes. The system can recommend the nearest mechanic shop to the users. This ensures that users can easily locate and book services from trusted and accessible service providers.

Moreover, the system incorporates a machine learning model that analyzes a separate dataset of used car prices. By considering factors such as car make, model, year, mileage, and condition, the model can predict an approximate price range for a specific used car. This feature assists users in understanding the potential market value of their vehicles, empowering them to make informed decisions regarding selling or purchasing. Machine learning algorithms are employed to train the prediction model, providing accurate estimates based on historical data. Through this project, users can benefit from a streamlined and convenient car service booking process, eliminating the need for manual appointment scheduling and reducing wait times. Additionally, users can gain valuable insights into the potential market value of their used cars, aiding them in making informed decisions regarding transactions.

2. LITERATURE REVIEW

A. CAR PRICE PREDICTION

India has a considerable size of car sales on top of the world day-to-day many buyers usually sell their cars after using for the time to another buyer, they name them as second possessor. Numerous platforms such as cars24.com, OLX.com that come up with these buyers with a platform where they can sell their old cars, but what should be the price of the car, this is the long-lasting query ever by using Machine Learning algorithms and they lead a response to this issue. Using a history of previous used car sales data and machine learning methodologies like Supervised Learning, they used to predict a fair price for the car. They also used machine learning techniques like Random Forest and Extra Tree Regression.

B. USED CAR PRICE PREDICTION USING K-NEAREST NEIGHBOUR BASED MODEL

In this paper, they proposed a model to estimate the cost of the used cars using the K nearest neighbour algorithm which is simple and suitable for small data set. Here, they have collected a used cars dataset and analysed the same. The data was trained by the model and examined the accuracy of the model among different ratios of trained and test set. The same model is cross-validated for assessing the performance of the model using the K- Fold method which is easy to understand and implement. They have used the
K nearest Neighbour algorithm and got accuracy 85% where the accuracy of linear regression is 71%. The proposed model is also validated with 5 and 10 folds by using K Fold Method. The experimental analysis shows that the proposed model is fitted as the optimized model.

C. AN AUTOMOBILE SMART SERVICE SYSTEM

Finding & buying the suitable spare parts, getting road assistance when the car broke in the middle of the road and maintenance plans for cars has been introduced. User has the facility to interact with AI powered chatbot to get things done easily and quickly. AI chatbot reduces the amount of training needed to use the application. VIN(Vehicle Identification Number) is scanned & decoded to automatically fill of car details. The Car Owners can log into the application and View their Cars, View Inspection Report, Request for a Car Inspection and View their Maintenance Packages. Whereas, the Maintenance Center Owner, Spare Parts Owner and Road Assistance Service Owner can register the Car Owners and Manage their subscriptions and orders.

D. THE IMPACT OF SERVICE QUALITY ON CUSTOMER SATISFACTION IN LOCATION BASED SERVICE

The aim of this paper is to identify service quality factors in mobile commerce and to test the relationship between these factors and its effect on customer satisfaction. To achieve this aim a quantitative study was conducted using an online questionnaire. There are five mobile service quality factors namely system availability, ease of use, reliability, responsiveness, and application design affects the satisfaction of customer. Responsiveness and Ease of use are the most significant factors that affect customer satisfaction. Car booking service providers focus more on ease of use issue in using such applications and then make improvement accordingly. SPSS tool used to analyze the data and to display the result. Initially Research performed only in sudan.

E. RAPID SERVICE - MOBILE APP FOR BIKE & CAR SERVICE

The application based on Flutter in which one can easily book a bike or car is proposed. Meanwhile, this application works as a mediator as it connects consumers and Mechanics. So, people can book slot for repairing purpose of their car or bike. After the booking, mechanic can see the pending request list. So, in their spare time, they go to the owner’s location and pick up their vehicle. Now the customer can see that their vehicles are on the running holder list. Whenever this repair is going on, the user can see all the details of their bike/car and can also communicate with a mechanic with chat as well as call. Users can also make an online payment to mechanic, as nowadays it is used by almost all people. Whenever the mechanic completed repairing, it goes down in the completed holder list.

3. PROPOSED SYSTEM

We propose a solution to develop a model where the car owners can book for their car service to the nearest service provider to enhance the customer experience by providing a user-friendly platform that simplifies the process of scheduling car service appointments. By offering convenience, reliability, and efficient communication, the project aims to streamline the car service booking process, benefitting both car owners and service providers.

We propose a solution to develop a model that can accurately predict the price of a used car based on its features. We implement and evaluate various learning methods on a dataset consisting of the sale prices of different makes and models. We will compare the performance of various machine learning algorithms like Linear Regression, Ridge Regression, Lasso Regression, Decision Tree Regression, Random forest regression, XGBoost and choose the best out of it. Regression Algorithms are used because they provide us with continuous value as an output and not a categorized value because of which it will be possible to predict the actual price of a car rather than the price range of a car.

4. DATA FLOW DIAGRAM

For Service booking, the application gets the input like their location and shows the list of nearest service providers to that location and the user can choose one and proceed to fill the appointment details like the date and time of the appointment, service needed and description about the service and finally the user needs to fill their name, email, phone number, make and model of the car and age of the vehicle to book an appointment.

For price prediction, the user has to input the details of their car like brand, model, vehicle age, transmission etc. Then with the help of these inputs, the model predicts the price of the user car.
5. SYSTEM ARCHITECTURE

The proposed system is based on the dataset for the price prediction and for service booking it is based on the location that the user given as an input. The dataset is downloaded from kaggle website. The dataset is cleaned and separated into train and test data. The model is trained using the Random Forest Regression algorithm. The accuracy of the model using RFR is predicted to be 98%.

![System Architecture](image)

6. TOOLS & TECHNOLOGY

**Visual studio Code:** Visual Studio Code is used for coding (compiling and running), objective purposes. Former platform is operated by Google and later one is managed by Microsoft. These both offer an integrated development environment with fast compilation rate.

**Flask:** Python Flask is a micro web framework for building web applications in Python. It is lightweight and easy to use, making it a popular choice for developers who want to build simple web applications quickly. Flask provides a simple and flexible structure for building web applications, with features such as routing, HTTP request handling, and template rendering. It also supports a wide range of third-party extensions, allowing developers to add functionality to their applications easily.

**Front-end:**

**HTML:** HTML, or Hypertext Markup Language, is the standard markup language used to create web pages. HTML provides a set of tags that define the structure and content of web pages, such as headings, paragraphs, lists, images, and links. It is a client-side language that is interpreted by web browsers, which render HTML code as web pages. HTML is the backbone of the web, providing the basic structure for web pages that are then styled and enhanced with other web technologies.

**CSS:** CSS, or Cascading Style Sheets, is a client-side language used to describe the presentation of web pages. CSS defines the style, layout, and appearance of HTML elements, such as fonts, colors, spacing, and positioning. CSS allows developers to separate the presentation of web pages from their content, making it easier to maintain and update web pages. It also supports responsive design, enabling web pages to adapt to different screen sizes and devices.

**JavaScript:** JavaScript is a client-side programming language used to create dynamic and interactive web pages. JavaScript enables developers to add functionality to web pages, such as form validation, animations, and user interaction. It is a versatile language that can be used for both front-end and back-end web development.

**MongoDB:** MongoDB is a popular and widely-used NoSQL database that offers flexibility, scalability and performance for managing and storing large volume of data. Unlike traditional relational databases, MongoDB follows a document-oriented data model, making it suitable for handling unstructured or semi-structured data. Here the MongoDB is used to store the appointment, user and vehicle details.

7. ALGORITHM USED

Random forest regression algorithm is used for price prediction

7.1 RANDOM FOREST

The Random Forest Regression algorithm is a powerful machine learning technique that is commonly used for regression tasks. It is an ensemble learning method that combines multiple decision trees to make predictions. Each decision tree in the random forest is built on a different subset of the training data and uses a random subset of features. The final prediction is obtained by aggregating the predictions of individual trees. It is widely used in various domains, including finance, healthcare, and retail, where accurate
regression predictions are required. Its ability to handle large datasets, handle missing values, and provide feature importance analysis makes it a popular choice for regression tasks. Overall, the Random Forest Regression algorithm is a versatile and robust machine learning technique that combines the power of decision trees and ensemble learning to provide accurate regression predictions.

Fig. 7.1 Model Training

8. PERFORMANCE METRICS

Performance metrics measure the behavior, activities, and performance of a business. It measures the data that is required within a range that is in the form of data. This measures the performance which is the key target to check.

When evaluating the performance of a Random Forest Regression model, several metrics can be used to assess its accuracy and generalization ability. Here are some commonly used performance metrics for Random Forest Regression.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Parameter</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Metrics</td>
<td>Regression model: MSE = 75%</td>
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<tr>
<td></td>
<td></td>
<td>RMSE = 75%</td>
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<td></td>
<td></td>
<td>R2 score = 87%</td>
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<tr>
<td>2.</td>
<td>Tune the Model</td>
<td>Hyper parameter Tuning – 90%</td>
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<td></td>
<td></td>
<td>Validation Method – Randomized Search CV</td>
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Table 8.1 Performance Metrics

9. CONCLUSION

In conclusion, the development of an online car service booking system using the nearest mechanic shops dataset and used car price prediction provides significant benefits and convenience to both car owners and buyers. By leveraging the power of data and machine learning algorithms, this system offers a seamless experience for car service booking and assists in estimating the prices of used cars.

For car service booking, the system utilizes a dataset containing information about various mechanic shops, including their locations. By integrating this dataset, users can easily find the nearest mechanic shop based on their location and specific service requirements. This streamlines the process of finding a reliable and convenient service provider, enhancing customer satisfaction and reducing time and effort spent on searching for a suitable mechanic.

Additionally, the system incorporates a used car price prediction feature using a dataset consisting of historical data on used car prices and relevant attributes such as make, model, year, mileage, and condition. Through the application of the Random Forest Regression algorithm, the system can estimate the price range for a given used car based on its characteristics. This functionality empowers potential car buyers to make informed decisions, negotiate prices effectively, and gauge the value of a used car in the market.

By combining the online car service booking and used car price prediction features, the system offers a comprehensive solution for car owners and buyers. It provides a one-stop platform that simplifies the process of finding reliable mechanics for car maintenance and assists in determining fair prices for used cars. This contributes to a more transparent and efficient automotive market, benefiting both individuals and businesses in the industry.

10. FUTURE ENHANCEMENT

Integrate the online booking system with service center management systems to automate service scheduling, inventory management, and spare parts ordering. This integration can streamline the entire service process and improve efficiency. This Project In machine learning model that will be connected with may dataset and with various website which can provide real time
data for price prediction. We may store data in their site or GitHub. Also, we may add big amounts of data of car price which can help improve the accuracy of the machine learning model. We are also trying to develop an Android app as a user interface for interacting and user-friendly with users. For better performance of the model, we plan to use neural networks and continuously improving the used car price prediction model by incorporating more advanced machine learning algorithms or exploring ensemble techniques can enhance the accuracy and reliability of price estimates. This would involve considering additional factors such as market trends, geographical location, and specific car features to provide more precise price predictions.

11. SAMPLE OUTPUT

Fig. 11.1 Fill the details about the car

Fig. 11.2 Result page for price prediction

Fig. 11.3 Choose the service provider
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