Car Recommendation System using Machine Learning

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ABSTRACT: In recent years, recommendation systems have proliferated like wildfire. When a client lacks the knowledge necessary to evaluate a certain item, it helps them find information and make decisions. It can be used to support its customers with efficient information sorting using a variety of diverse techniques. For a new customer, choosing the most appropriate car requires an extra effort/time and has become a challenging task. The main problems are that those working in the consultation are not technically proficient and give little thought to the needs of the client. Selling the car is their top priority. Customers thus encounter several challenges both before and after purchasing their cars. This research provides a revolutionary automobile recommender system that uses machine learning technologies to direct and suggest options to clients in order to solve this issue. By filtering individualised information based on the user's preferences from a massive volume of information, it is a software tool and approaches that offer suggestions based on the customer's taste to discover new relevant things for them. Popular machine learning algorithm 'Random Forest Algorithm' is a part of the supervised learning methodology. It can be applied to ML issues involving both classification and regression Instead than depending on a single decision tree, the random forest uses forecasts from each tree and predicts the result based on the votes of the majority of predictions. The system has a mechanism where the vendor chooses a price at random, and the buyer is unaware of the car's current market value. In actuality, neither the seller nor the price at which he ought to sell the car have any notion of the current value of the car. We have created a model to solve this issue that will be very successful.

KEYWORDS: Car Recommender systems, Random Forest Algorithm, Price prediction, Hybrid Filtering, Machine learning

I. INTRODUCTION

Due to the complicated way of life of the population, owning a car has become a necessity. There are many different domestic car kinds on the market. Some of them have multiple uses, while others have particular uses. To meet the needs of its clients from various social and economic backgrounds, the auto industry makes significant investments in the development of numerous car types.

To some extent, it involves technical know-how and direction to make the best decision by analysing the needs of the consumer. Thus, before purchasing a car, the majority of customers speak with specialists or advisors. Most of the currently available consulting services lack technical expertise, customer requirement analysis expertise, or both. Therefore, utilising cutting-edge machine learning techniques, we looked into a potential fix for this problem.

As a result, there is a large variety in the pricing of automobiles with the same specifications. Therefore, it can be difficult for consumers who are planning to purchase a car to select the most suitable car. The recommendation system is extensively researched and applied in both the e-commerce and non-e-commerce fields to maximise profit and carry out the precision marketing objective.

It uses the learned model to generate tailored recommendations. The details of our research are presented in the following sections. We go over a few of the earlier studies that are relevant to our topic in the next section. We provide our study in the section that follows with a thorough explanation and experimental analysis. We highlight some of the limits of the suggested method, open questions for the research community, and future research objectives as we wrap up this work.

Sr. No.	Title of the paper	Year	Findings
1	Recommender Systems Challenges and	2019	In this paper, different techniques in recommender

II. LITERATURE REVIEW

Sr. No.	Title of the paper	Year	Findings
	Solutions Survey(IEEE)		systems and their advantages and disadvantages were discussed.
2	Prediction car prices using quantify qualitative data and knowledge- based system	2020	In this paper techniques for extraction of meaning, data interference, rules for qualitative data.
3	Content-Based Recommendation Using Machine Learning (IEEE)	2021	Here, they have studied about Content Based Recommendation with three-step profiling method.
4	A Comprehensive Study of Regression Analysis and the Existing Techniques (IEEE)	2022	This paper examines and compares various regression models and machine learning algorithms.
5	The Design of Web Based Car Recommendation System using Hybrid Recommender Algorithm	2018	Web based recommendations for any item is mandatory in E- commerce based web sites. This paper is about the design of web based car recommendation system using the hybrid recommender algorithm.

suggestions based on the person's preferences to find new required content for them, such as useful products on e-commerce sites like amazon.in, videos on YouTube, posts on the wall of social media like Facebook, and automatically recommended news on online news websites. By reviewing past surfing habits, product reviews, and various user behaviours, RS determines suggestions that are made in response to the customers. The typical output of recommendation systems is a large number of recommendations using one of the available strategies.

This type of recommender system aims to suggest users desired things based on their prior behaviour and interpersonal relationships of social networks by taking into account three perspectives: 1) Personal influence, which suggests who you would believe, 2) Interest circle derivation, which suggests who has interests similar to yours, and 3) User individual interest, which affects what goods you would be enthusiastic about. Depending on how they approach recommendations, five main types of personalised recommendation systems are characterised.

RECOMMENDATION SYSTEM

Have you ever found the Facebook or LinkedIn "People you may know" feature amusing? Using information about your friends, friends of friends in your friend circle, present location or possibly a previous place, skill sets, groups, favourite pages, and other factors, this tool provides a list of individuals you might know who are similar to you. These suggestions are personalised for you and vary from user to user. A recommendation system is a solution to the problem of giving the consumer the right items despite looking through many different options.

Although people's likes differ from one another, there are some patterns that they all share. RS are software tools and techniques that offer

Random Forest Algorithm is a supervised learning algorithm. Random Forest is a part of the supervised learning methodology. It can be applied to ML issues involving both classification and regression. It is built on the idea of ensemble learning, which is a method of integrating various classifiers to address difficult issues and enhance model performance.

Random Forest, as the name implies, is a classifier that uses a number of decision trees on different subsets of the provided dataset and averages them to increase the dataset's predictive accuracy. Instead than depending on a single decision tree, the random forest uses forecasts from each tree and predicts the result based on the votes of the majority of predictions.

Both classification and regression tasks can be handled by Random Forest.

It is able to handle big datasets with lots of dimensions.

It improves the model's accuracy and avoids the overfitting problem.

HYBRID FILTERING

In a hybrid approach, we combine the two advised methods of content-based and collaborative filtering to maximise benefits, improve outcomes, and lessen problems and challenges associated with these applications.

Hybrid approaches have Multi-methods:

Weighted: Each component that the system recommended was given a numerical total that was combined.

Switching: The system offers the user a variety of recommendations and selects the one they want from among those options.

Mixed: The user receives recommendations for a variety of goods at once from the system.

Feature Combination: Several information sources are combined to create features for the recommendation system.

Feature augmentation: Used to compute a set of features for recommender systems, is one of the key components of the following technique.

Cascade: Things with a high weighted priority score appear first in the recommender list, followed by items with a low weighted score, decreasing.

Meta-level: Is one of the input methods used to create a model for the algorithmic step after the recommender system.

By combining these several approaches, great performance is achieved while reducing issues and challenges brought on by employing content-based or collaborative filtering alone.

PRICE PREDICTION SYSTEM

The year the car was registered with the Road Transport Authority is indicated. The worth of an automobile will increase with its level of modernity. The value of the automobile will decrease with each passing year. To anticipate the price of second-hand cars, a machine learning or self-learning capable system is required. The main goal of this project, which will be a real-time assignment, is to create a supervised machine learning model for forecasting the worth of a car based on several parameters.

The subject of price prediction is quite intriguing and well-known. The market for used cars has shown a sharp increase in value, which has increased its market share. In India, there are close to 3.4 million second hand cars sold annually. This gives the issue of auto price forecast even more significance. Because rates typically depend on a variety of various elements, accurate automobile price forecast requires specialist expertise. The most important ones are often brand, model, age, horsepower, mileage, and economic factors affecting demand and supply. Due to the regular increases in the cost of fuels such as diesel, gasoline, and compressed natural gas, the gasoline used in a car has an impact on the price of an automobile.

III. CONCLUSION

Future research can be done to analyse and develop new strategies and attributes for effective recommendation system deployment. We can create effective recommendation systems that take

into account numerous factors by merging recommendation systems with machine learning (ML) and Random Forest Algorithm. We can teach the algorithm to give the best recommendations based on its prior experiences using machine learning. This will produce a very effective recommendation system with its own intelligence that can foresee the user's best interests and hence deliver recommendations with a high degree of accuracy.

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