International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 10 Issue 6 ǁ 2022 ǁ PP. 1830-1833

Show My Ride Vehicle Recommendation System

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Abstract –*Show My Ride is a webapp approach to assist the consumer to choose a vehicle not dependent on peer suggestions nor basic news reviews but rather harnessing the modern method of Machine Learning tools to choose a vehicle that fits their budget and one that makes the most sense for them. Using this ML approach, customers can get a recommendation based on previous purchases of customers with similar requirements. For privacy and mostly irrelevant, the purchaser of the vehicles is not a field in the DB. The app has only one user which is the through which the customer enters his requirements through one webpage and his recommendation is generated in another page which is a single row which the algorithm decides is the best suggestion. The admin does not have a dedicated UI but rather directly alters code and DB in the backend to improve search results as new data is added.*

Key Words: *Machine Learning, k-NN algorithm, recommendation engines, natural language processing (NLP), neural networks.*

Date of Submission: 15-06-2022 Date of acceptance: 30-06-2022

I. INTRODUCTION

When it comes to automobiles, India is one of the most demanding consumers and for automakers it's a balancing act for manufacturers to provide to customers exactly what they are looking for and automakers many a times spend less on R&D and more on advertisement. Recommendation systems play an important role for purchase of products. Online platforms depend on recommendation systems to suggest products to customers and also enable suggestions for combo purchase. The Indian automotive market is cramped and filled with products and sometimes it's even difficult for an enthusiast to understand each vehicle and where they sit within the portfolio. An average Indian buyer will not worry about parameters such as cornering speed, handling characteristics or the chassis rigidity but rather looks for peace of mind and satisfaction after purchase. This includes the entire experience from first viewing the car to aftersales and service.Indian auto news portals do not have a clear structure for conducting review of each car and each suggestion is only an opinion of the reviewer.

Buyers refer to online reviews, advertisements and suggestions from the web to choose their new car. This is not a systematic method of vehicle suggestion as every buyer is unique and has personal preferences and need not settle to the demands of another user. This has motivated our team to build a recommendation system that takes in important parameters that a buyer would check for in a new car. The system is presently relying on a used car dataset to test the algorithm. The system can serve in its full potential once a dedicated dataset can be prepared for it.

II. LITERATURE SURVEY

In Paper[1], the authorswere inspired by problems affecting new vehicle purchase where for a new customer choosing a vehicle to fit his needs is a time-consuming task. This paper implements a neural network modeltrained using data collected from vehicle users and vehicle sellers. Other than neural network model, the proposed recommendation system uses natural language processing (NLP) to produce more personalized recommendations. Paper [2] was referred to get an overview about the different approaches available and

implementation for using recommendation systems. Paper [3] was also referred to learn more about recommendation systems and know about the different techniques of recommendation system like collaborative filtering, content-based filtering and hybrid filtering.
In our system, we have implemented the KNN algorithm. The KNN algorithm allows the user to get suggestion based on his inputs to the system. The system then passes on this data to the algorithm which process and maps the input and finds the closest result. This result will then be displayed as the output.

III. METHODOLOGY

3.1 Python

[4]Python is one of the most widely used programming language in use. It is loved by developers due to its easy-to-understand syntax and its ability to create powerful applications. Python is a high-level, interpreted, general-purpose programming language. Its design philosophy emphasizes code readability with the use of significant indentation. Python is dynamically-typed and garbage-collected. It was conceived in the late 1980's by Guido Van Rossum. The vast number of libraries available for Python make it do many code intensive tasks into simple code which might even only involve only an import statement.
Python has enabled the app to use the Django webapp framework for ease of building the app.

3.2 MySQL

[5]MySQL is an open-source relational database management system. Its name is a combination of "My", the name of co-founder Michael Widenius's daughter, and "SQL", the abbreviation for Structured Query Language.

3.3 KNN Algorithm

[6] In statistics, the k-nearest neighbors' algorithm (k-NN) is a non-parametric supervised learning method first developed by Evelyn Fix and Joseph Hodges in 1951,[1] and later expanded by Thomas Cover.[2] It is used for classification and regression. In both cases, the input consists of the k closest training examples in a data set. The output depends on whether k-NN is used for classification or regression:

In k-NN classification, the output is a class membership. An object is classified by a plurality vote of its neighbors, with the object being assigned to the class most common among its k nearest neighbors (k is a positive integer, typically small). If k = 1, then the object is simply assigned to the class of that single nearest neighbor.

In k-NN regression, the output is the property value for the object. This value is the average of the values of k nearest neighbors. KNN is a type of classification where the function is only approximated locally and all computation is deferred until function evaluation. Since this algorithm relies on distance for classification, if the features represent different physical units or come in vastly different scales then normalizing the training data can improve its accuracy dramatically.

The k-nearest neighbor classifier fundamentally relies on a distance metric. The better that metric reflects label similarity, the better the classified will be. The most common choice is the Minkowski distance.
EQUATION:

$$dist(x,z)=(d\sum r=1|xr-zr|p)1/p.$$

WORKFLOW

Figure1 shows a diagram for the workflow the system. The user enters his requirements through a form available on the homepage. The input of the form will be passed onto the model for processing which maps it to the best available result in the dataset and this result is displayed through a column in the result page. Figure 2 shows the welcome page or homepage. The user is first introduced to a welcome page. Scrolling below will reveal a form which allows the user to input his requirements. The requirements are passed over to the algorithm. The algorithm will compare the dataset and display a result to the user which has the best match to the entries within the dataset. This result is displayed in another form in a different page as shown in Figure 3. The webapp was designed using Django Python web framework and Mysql was used for database duties.

SCREENSHOTS AND FIGURES

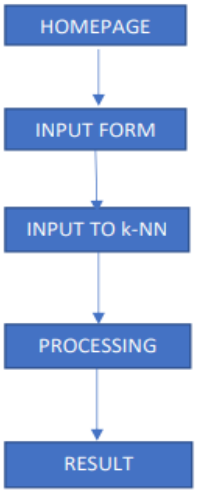

Figure 1:Workflow

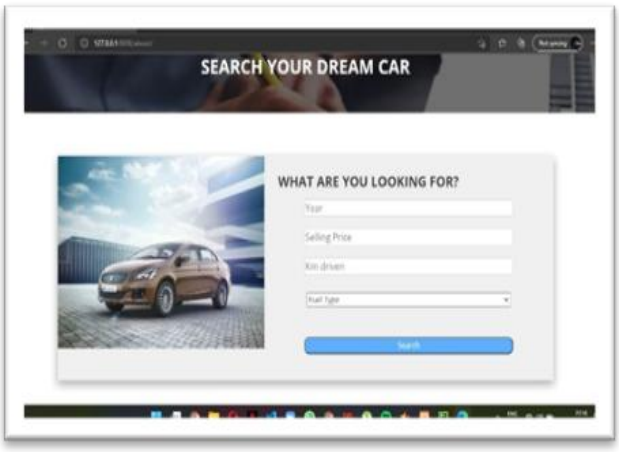

Figure 2:Homepage form

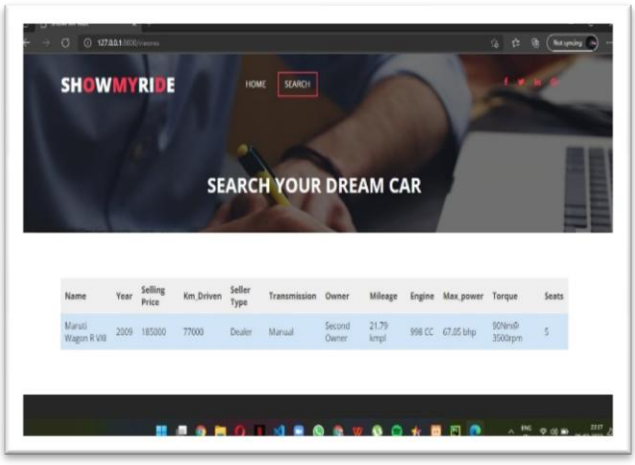

Figure 3:Result page

IV. EXPERIMENTS AND RESULTS

The Show My Ride app was developed to use the assistance of machine learning to improve recommendation systems to enable better purchase decisions for consumers. This significantly enhances the present system of peer reference and biased online portals that does not use a well-established rating system for

recommendation. ShowMyRide suggestions are based on a dataset containing sales data of vehicles that were recommended using an expert panel and therefore the dataset is assumed to be non-biased and systematic. By an experiment conducted among peers, it was found that people would prefer such an app over existing method of taking opinions and recommendations from reviews and peers. This might be because people would prefer a suggestion based on proper process rather than blindly trusting reviews where the benchmark parameters are unknown.

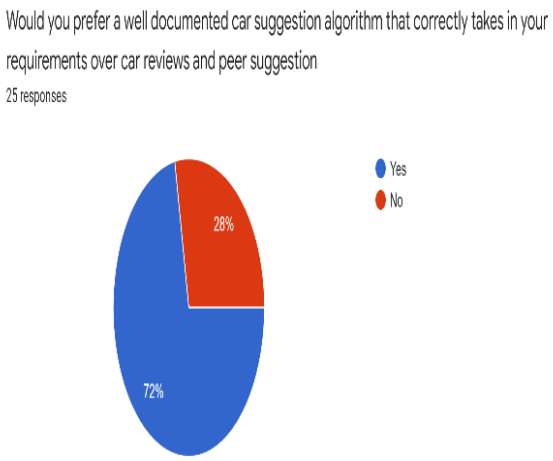

Figure 4:Survey conducted

V. RESULTS

To test the validity and worthiness of such a system, we conducted a survey among peers to know how well received such a product will actually be. To conduct the experiment, we relied on a google form survey to ask our peers whether they would prefer the traditional method of vehicle suggestion and purchase which does not ensure that every consumer is satisfied but rather prefer a systematic method like ShowMyRide vehicle recommendation system and it was found out that our system is one that a potential customer would prefer more over any other unsystematic method. In a total survey conducted among 50 peers, 38 individuals preferred our system more over any other system. This has cemented the fact that the Indian automotive scene requires an urgent update to how recommendation and new car buying suggestions are carried out.

VI. CONCLUSIONS

Show My Ride is a webapp based approach to assist the consumer to choose a vehicle not dependent on peer suggestions nor basic news reviews but rather harnessing the modern method of Machine Learning tools to choose a vehicle that fits their budget and one that makes the most sense for them. Using this ML approach, customers can get a recommendation based on previous purchases of customers with similar requirements. The system was invented to improve how potential customers would opt to buy new cars by suggesting vehicles through a recommendation system.

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