A Novel Approach Of Car Recommendation Using Machine Learning Algorithm

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Abstract: This research paper explores the system which is used to recommend car to the users based on the requirement provided by the user. Various requirement of users while choosing a car such as capacity of car, fuel type, and budget are considered and based on that various recommendations are given to user. These recommendations are suggested by using machine learning techniques and different visualization options are available, in order to provide user detailed analysis based on different parameters. The online check option is also available which makes system more supportive and compare different models based on various parameters. The system enables users to choose among plenty of options and select the best suited model.

Index Terms: Car recommendation, Mileage, Fuel Type, Machine Learning, Datamining, Analytics, Deep Learning

1 INTRODUCTION

THIS driving a vehicle is basic for people when everything is said in done considering the way where that it licenses status and to specific control and self-rule. In wretchedly populated zones, owning a vehicle is fundamentally perseveringly tremendous, since it gives the standard opportunity to going long fragments in view of a nonattendance of open vehicle. For logically settled people, experiencing more difficulties walking (around the bus stop) and cycling, driving is regularly the basic decision for self-directing versatility. A few assessments have found that over 90% of consistently organized drivers show that ending any defilement of driving would control their opportunity and adaptability. Comparative drivers passed on pressure about the low thought of open vehicle affiliations. This weight transmitted an impression of being developed on reality considering the way that half of those respondents who starting late had ended any distortion of driving felt open vehicle to be, at any rate in some measure, lacking.

Before powerfully orchestrated people quit driving, they generally decline the complete they drive and limit their going to neighborhood goes in striking regions and under clear driving conditions. The better the course of action of elective systems for versatility, the in every practical sense certain a driver is to start using them for endeavors the individual being suggested would lean toward not to drive, sometime before completion of drive. This makes it dynamically obvious to remain adaptable in the wake of consummation of drive. The nonappearance of dumbfounding and conceivable vehicle decisions as opposed to the private vehicle, got together with land-use plans that make walking irritating or boundless, adds to the issues experienced by people who need to stop driving, conspicuously in North America.

In any case, indistinguishable issues occur in Europe for logically masterminded people living in regular zones and typical areas, as they reasonably do. In Great Britain, intelligently masterminded drivers have all the stores of will unmistakably stop driving in case they live in urban regions where walking, transports and taxis offer reasonable adaptability decisions. The ability to go everywhere and do everything without a vehicle is in like manner referenced in considers on purposes behind driving less. Regardless, the most basic factors for halting to drive transmit an impression of being security, achievement, and record Men significantly more routinely quit any bending of driving in perspective on awful thriving. Women will when everything is said in done leave the wheel previously and for less squashing reasons, for instance, driving just sometimes.

2. SYSTEM FLOWCHART

In this paper first module is home page, which consists of login screen for authenticate persons to entry and over view about the system. The second phase of projects consist of various available functions such as load and clean data, suggest me a car, Compare Car models and different statistics about various car modules. Each and every module has specific functions and operations.

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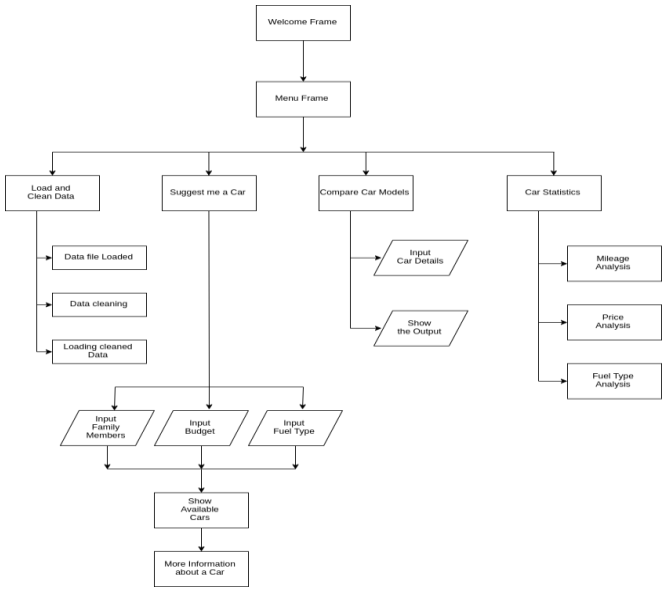

Fig. 1 Flowchart of car recommendation System

3. TEST CASES AND RESULTS

Car Recommendation Window:

Clicking on "Suggest me a Car" in the MENU FRAME brings you on this frame. This window looks as follows:

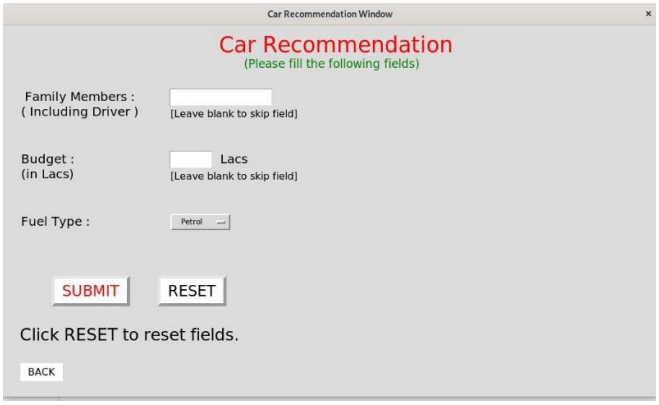

Fig. 2 Car Recommendation window

This window provides suggestion of car(s). User needs to input:

1. Number of family members
2. Budget (in Lacs)
3. Fuel Type
   a. Petrol
   b. Diesel
   c. CNG
   d. Anything (for flexibility)

User can leave the field(s) BLANK to skip a field. This provides flexibility to the user. Test Cases:

1. If user enters a non-positive value, the system suggests to enter a value greater than ZERO.
2. If number of seats is beyond the limit, user is prompted for the same.
3. If user has less budget, he is suggested for a car loan.
4. If there are no cars in the dataset, user is notified for the same.
5. Input is in appropriate format.

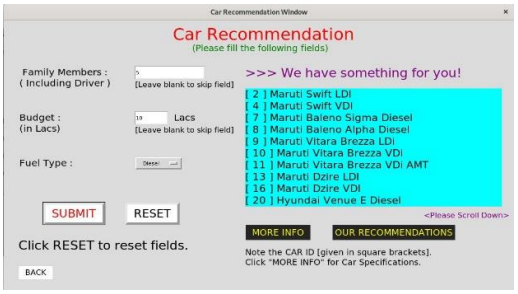

Fig. 3 Results according to requirement

Now, there are two buttons

1. More Info
2. Our Recommendations

Button I: More Info

This button opens a window which gives car specifications to the user. The user needs to input the car ID which he/she is supposed to note in the previous frame (Suggestion Frame).

There is also an option to check online for a car model.

Fig 4. More Information of car

Button II: Our Recommendations

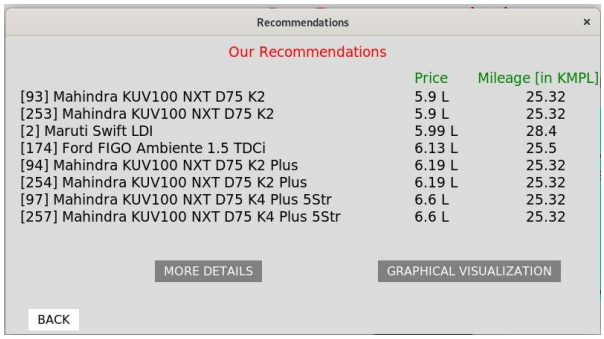

Fig 5. Our Recommendation Window

This window shows the Car Recommendations. This sorts the Cars according to user requirements, so that user gets the desired facilities in minimum price.

There are two buttons:

1. More Details
2. Graphical Visualisation

Button I: More Details

This provides more details about a Car if user inputs a Car ID.

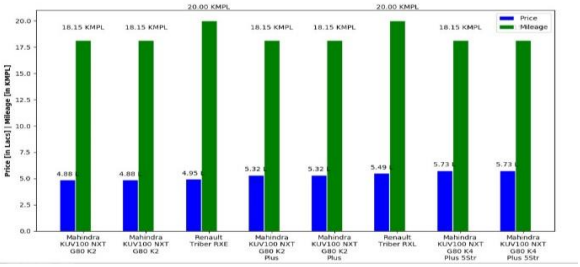

Figure 6. Our Recommendation Window

Button II: Graphical Visualisation

Visualisation Results:

This is a part of Data Visualization. Some of the graphs in this section are:

i. Price Analysis
ii. Fuel Type Analysis
iii. Best Priced Cars
iv. Best Mileage Cars
v. Best Price with Mileage
vi. Mileage Analysis

I. Price Analysis

This classifies the Car Models based on their price. We can conclude that average price of popular cars is around 17 Lacs. This means it is profitable for the companies if they manufacture more cars in this price segment.

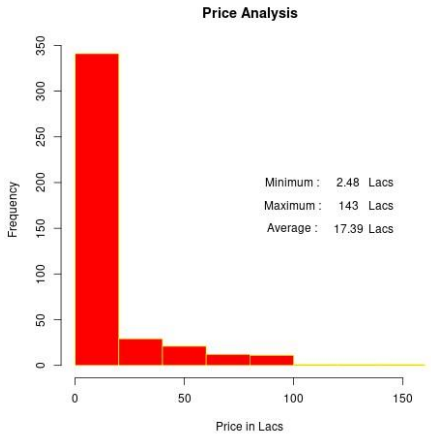

Fig 7. Price Analysis

III. Fuel Type Analysis

There are 57.07% cars running on diesel. This means people are ready to invest more at first to have better savings (Diesel engines have more mileage). There are 1.2% cars on CNG. CNG costs almost 50% of petrol per km. Yet, there are 41.73% cars on Petrol. It means people care about the life of their engine more than fuel costs.

Fig 8. Fuel Type Analysis

IV. Best Priced Cars

This graph shows the cars which are most affordable to the user. Hence, the user can decide which car is most budget-friendly and make the choice accordingly.

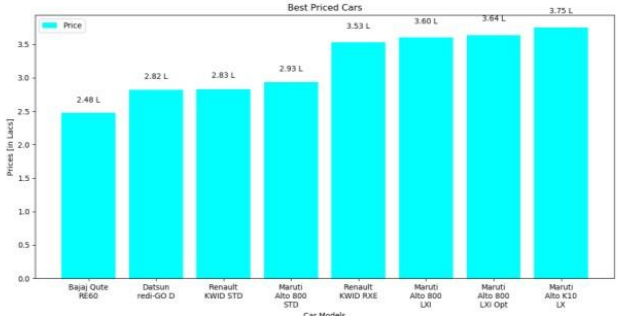

Figure 9. Best Priced Cars

V. Best Mileage Cars

This graph helps the user to know the cars which offer the best mileage. Hence, the user comes to know in one Litre how many Kilometres a particular car model can travel (On an average).

Fig 10. Best Mileage Cars

VI. Best priced cars with mileages

This graph shows the price of cars along with their mileages which are most affordable to the user. Hence, a user can decide according to his choice based on the visualization.

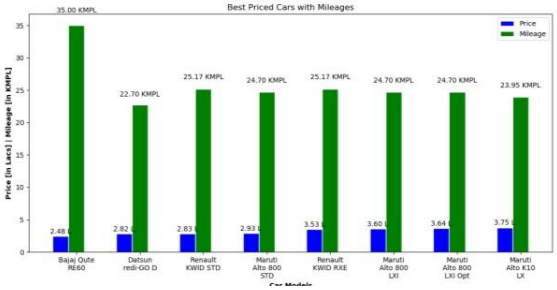

Fig 11. Best Priced Cars with Mileage

VII. Mileage Analysis

This gives the mileage analysis, i.e., minimum, maximum and average mileage of the available car models. This analysis helps to know the efficiency of the car models.

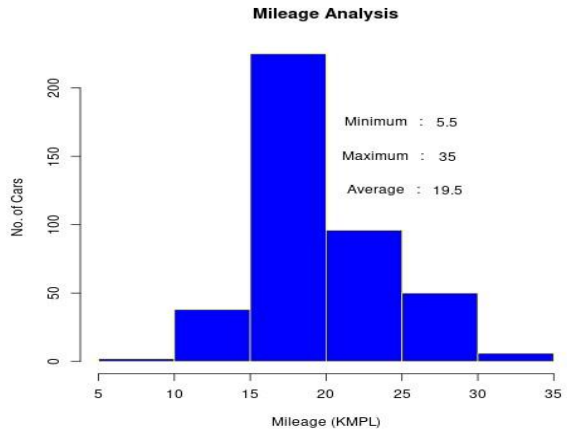

Figure 12. Best Priced Cars with Mileage

3. CONCLUSIONS

This system is mainly help clients to purchase car without more knowledge about car, also suggests various options available based on the customer requirements. This system has the potential to reduce a lot of research work of the user. It can correctly suggest the user car model(s) based on his/her requirements. To provide accurate and up-to-date information to the user, links are provided for each car model. The user can click on the link and thereby get the latest, updated information on the internet. This is very useful as the user can view the images, 360 degrees view of the car, reviews of other users, ratings, etc. Data Visualization helps to see the analysis of the available car models at a glance. If user is low on budget, he/she has an option to view Car Loans of popular banks and direct links to get the same. This system can surely help to choose the appropriate car meeting the user's requirements.

References

[1] A.J. Patel, J.S. Patel, Ensemble systems and incremental learning, in: 2013 International Conference on Intelligent Systems and Signal Processing (ISSP), 2013, pp. 365–368.

[2] A. Prioletti, A. Mogelmose, P. Grisleri, M.M. Trivedi, A. Broggi, T.B. Moeslund, Part-based pedestrian detection and feature-based tracking for driver assistance: real-time, robust algorithms, and evaluation, IEEE Trans. Intell. Transport. Syst. 14 (3) (2013) 1346–1359.

[3] P. Viola, M. Jones, Rapid object detection using a boosted cascade of simple features, in: IEEE Conference on Computer Vision and Pattern Recognition, January 2001, pp. 511–518.

[4] L. Shao, X. Zhen, D. Tao, X. Li, Spatio-temporal laplacian pyramid coding for action recognition, IEEE Trans. Cybernet. 44 (6) (2014) 817–827.

[5] Ambeth Kumar, V. D., Malathi, S., Venkatesan, R., Ramalakshmi, K., Vengatesan, K., Ding, W., & Kumar, A. (2019). Exploration of an innovative geometric parameter based on performance enhancement for foot print recognition. Journal of Intelligent & Fuzzy Systems, 1–16. https://doi.org/10.3233/jifs-190982

[6] S. Sivaraman, M.M. Trivedi, Looking at vehicles on the road: a survey of vision-based vehicle detection, tracking, and behavior analysis, IEEE Trans. Intell. Transport. Syst. 14 (4) (2013) 1773–1795.

[7] Kesavan, S., Kumar, E. S., Kumar, A., & Vengatesan, K. (2019). An investigation on adaptive HTTP media streaming Quality-of-Experience (QoE) and agility using cloud media services. International Journal of Computers and Applications. https://doi.org/10.1080/1206212X.2019.1575034

[8] Vengatesan, K., Kumar, A., Naik, R., & Verma, D. K. (2019). Anomaly based novel intrusion detection system for network traffic reduction. Proceedings of the International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud), I-SMAC 2018. https://doi.org/10.1109/I-SMAC.2018.8653735

[9] M. Feng et al., "Big Data Analytics and Mining for Effective Visualization and Trends Forecasting of Crime Data," in IEEE Access, vol. 7, pp. 106111-106123, 2019.

[10] M. Li, H. Wang and J. Li, "Mining conditional functional dependency rules on big data," in Big Data Mining and Analytics, vol. 3, no. 1, pp. 68-84, March 2020.

[11] E. Lee et al., "Game Data Mining Competition on Churn Prediction and Survival Analysis Using Commercial Game Log Data," in IEEE Transactions on Games, vol. 11, no. 3, pp. 215-226, Sept. 2019.

[12] S. G. Teo, J. Cao and V. C. S. Lee, "DAG: A General Model for Privacy-Preserving Data Mining," in IEEE Transactions on Knowledge and Data Engineering, vol. 32, no. 1, pp. 40-53, 1 Jan. 2020.

[13] A. M. Sainju, D. Aghajarian, Z. Jiang and S. Prasad, "Parallel Grid-Based Colocation Mining Algorithms on GPUs for Big Spatial Event Data," in IEEE Transactions on Big Data, vol. 6, no. 1, pp. 107-118, 1 March 2020.

[14] Z. Feng, S. Zhu, J. Wu and H. Guo, "Theory and Method of Time-varying Computational Experiments for the Fully Mechanized Mining Process in an Artificial System Environment," in IEEE Access, vol. 7, pp. 168162-168174, 2019.

[15] K. Vrotsou and A. Nordman, "Exploratory Visual Sequence Mining Based on Pattern-Growth," in IEEE Transactions on Visualization and Computer Graphics, vol. 25, no. 8, pp. 2597-2610, 1 Aug. 2019.