International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 05 | May 2021 www.irjet.net p-ISSN: 2395-0072

Predict Car Fuel Efficiency Using Linear Regression and add UI

Kunal Pangare[1], Sweta Nimbalkar[2] , Ravishankar Pal[3] , Prof. Roshan Bauskar[4]

[1,2,3]*Student, Dept. of Computer Engineering, L.E.S. G.V.Acharya Institute of Engineering and Technology, Shelu, Maharashtra, India*

[4]*HOD, Dept. of Computer Engineering, L.E.S. G.V.Acharya Institute of Engineering and Technology, Shelu, Maharashtra, India*

Abstract: *consider the growth of the automobile industry across since the past two centuries, we are witnessing the fuel pricing and customers being more particular about the features the automobile makers are constantly optimizing their processes to increase fuel efficiency but what if you could have a reliable estimator for car's given some known specifications about vehicle?.*

Ability to model and predict the fuel consumption is vital in enhancing fuel economy of vehicles and preventing fraudulent activities in fleet management. fuel consumption of a vehicle depends on several internal factors such as distance,load,vehicle characteristics and driver behavior, as well as external factors such as road conditions, traffic, and weather. However, not all these factors may be measures or available for the fuel efficiency analysis. Hence, the challenge is to model and/or predict the fuel efficiency only with the available data, while still indirectly capturing as much as influences from other internal and external factors.

Machine learning is suitable in such analysis ,as the model can be developed by learning the patterns in data.

Key words: *MPG(mileage per gallon), tensor(array), hbs(handlebars)*

1)INTRODUCTION:

The automotive industry is extremely competitive. with increasing fuel prices and picky consumers, automobile makers are constantly optimizing their processes to increase fuel efficiency. but what if you could have a reliable estimator for a car's mpg given some known specifications about the vehicle? Then, you could beat a competitor to market by both having a more desirable vehicle that is also more efficient, reducing wasted R&D costs and gaining larger providing an alternate solution to simulation models that are used to predict the fuel consumption of vehicles chunks of the market .

1.2) aim and objective:

- To build a model that could reliably predict a car's MPG
- Providing an alternate solution to simulations models that are used to predict the fuel efficiency of cars
- It can also be useful in detection of anomalous cars by identifying irregular fuel efficiency.
- Minimize model size and increase accuracy.

2)PROPOSED SYSTEM

This paper explains the fuel efficiency of car's using linear regressions with gradient descent algorithm and adding UI server and mongo DB database. the proposed structure of the fuel efficiency system perform following task:A)server: start express server in terminal in our code file B)webpage: write localhost:3000 on address bar then load our page . we see the form for calculate mpg of car's

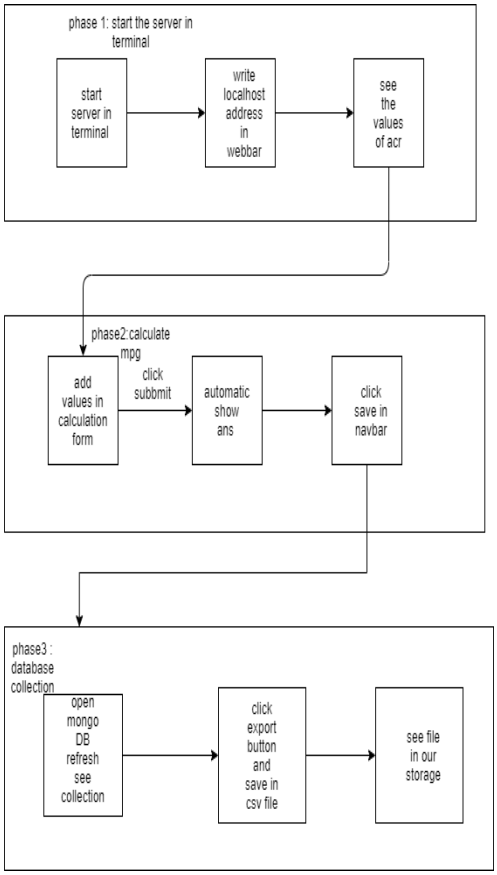
C)hbs : this is a template engine support the node js and it serve the our html tag, CSS , values from node js .

d)mongo DB :mongo client connect our server and store the value in database with data schema. export csv file of our data in our storage from mongo DB. we use node js in backend side, server express , database is mongo DB . we calculate mpg on hbs file. hbs means handlerbars. Hbs I template engine.this engine server static data on webpage that's help us to perform mpg calculation on webserver.

We use algorithm to calculate car MPG values using linear regression with gradient descent. this make solve machine learning problem. gradient descent is an optimization algorithm used to find the values of parameter(coeffients) of a function (f) that minimizes a cost function (cost).gradient descent is best used when the parameters cannot be calculated analytically(eg. Using linear algebra) and must be searched for by an optimization algorithm.

Taking data of car from internet and make csv file. car displacement, car name, horsepower, weight , their actual mpg value. We use displacement, weight, horsepower for predict mpg value. take displacement in cubic inch and weight in tons, horsepower in hp.

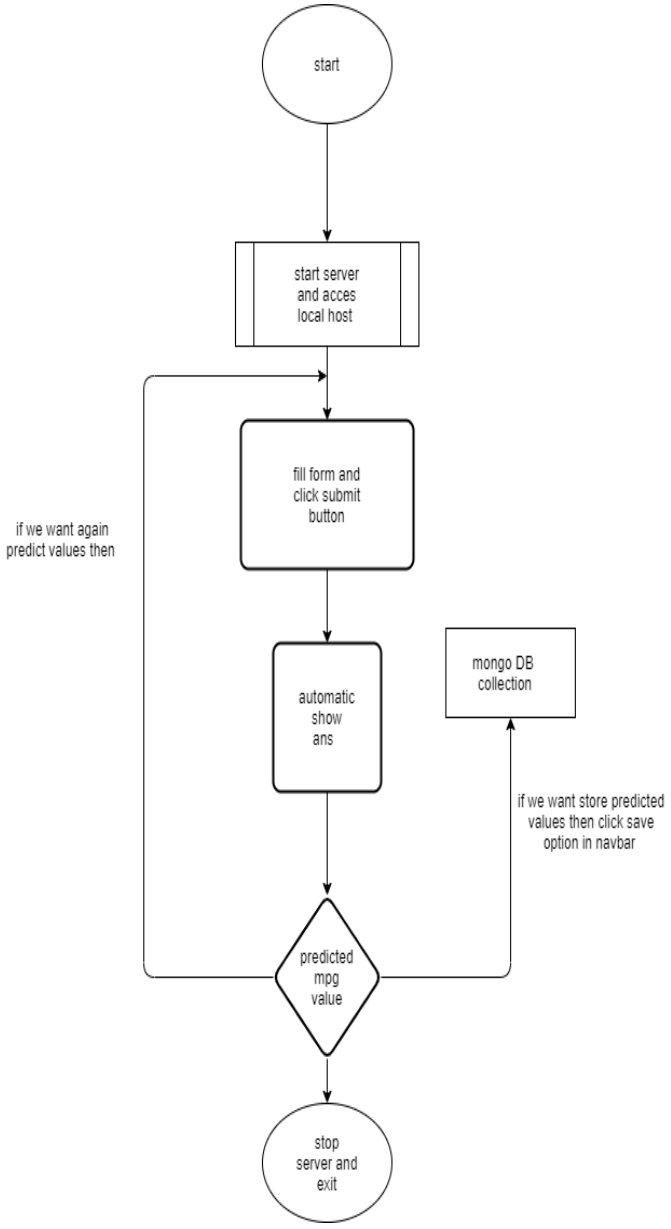
3)SYSTEM ARCHITECTURE



4)FLOWCHART:

We use car displacement, weight, horsepower for predict mpg values. We use express for server to get ,post values in database and webpage. we use mongo DB database foe storing mpg values. We template engine to render the html, CSS, JavaScript. We gradient descent algorithm for model accuracy. first step we start server from terminal in code editor then we access localhost::port and template engine render the html , CSS , JavaScript on webpage.

Then we see the form for calculate the mpg value then add car values then click submit button. Automatic show Ans in answer webpage and that page on nav bar have save option click on it then open mongo compass and refresh it and see the collection . then we want data use export option then save data in csv file.



5)CONCLUSION:

We built a model that could reliably predict a car's mpg given some information about the car within 2.5 mpg of the actual value. This model could be trained with newer car data and be used to predict competitor's future mpg ratings for upcoming cars, allowing companies to potentially resources currently used on R&D today on making more efficient, more popular vehicles that outshine competitors. Additionally, in the field of automotive engineering, there is a significant difference in the running mechanism of the engine between cold and hot starts so that the impact on the fuel consumption is also worth paying attention to. While our model may be inaccurate in some cases, we talked about how our dataset can contain inaccurate values for the MPG, and oftentimes, our predictions are more accurate than the values in the dataset. For newer cars, the collected data is

significantly more reliable, so our model will be able to perform better with different, more accurate dataset.

6)ACKNOWLEDGEMENT:

We are very grateful to our project guide Prof. Roshan Bausker who always supported and guided us. We express our immense pleasure and thankfulness to all faculty members of the Department of Computer Engineering of G. V. Acharya Institute of Engineering and Technology.

7)REFERENCES:

[1] Dua, D. and Graff, C. (2019). UCI Machine Learning Repository [http://archive.ics.uci.edu/ml]. Irvine, CA: University of California, School of Information and Computer Science.

[2] Quinlan, J. Ross. "Combining instance-based and model-based learning." In Proceedings of the tenth international conference on machine learning, pp. 236-243. 1993.

[3] Pelleg, Dan. "Scalable and practical probability density estimators for scientific anomaly detection." PhD diss., PhD thesis, Carnegie Mellon University, 2004. Tech Report CMU-CS-04-134, 2004.

[4] Tao, Qingping. "Making efficient learning algorithms with exponentially many features." PhD diss., University of Nebraska-- Lincoln, 2004.

[5] Palmer, Christopher R., and Christos Faloutsos. "Electricity based external similarity of categorical attributes." In Pacific-Asia Conference on Knowledge Discovery and Data Mining, pp. 486- 500. Springer, Berlin, Heidelberg, 2003.

[6] Inui, Kentaro, Jing Jiang, Vincent Ng, and Xiaojun Wan. "Proceedings of the 2019 Conference on Empirical Methods in Natural Language Processing and the 9th International Joint Conference on Natural Language Processing (EMNLP-IJCNLP)." In Proceedings of the 2019 Conference on Empirical Methods in Natural Language Processing and the 9th International Joint Conference on Natural Language Processing (EMNLP-IJCNLP). 2019.

[7] Pelleg, Dan, and Andrew Moore. "Mixtures of rectangles: Interpretable soft clustering." In ICML, pp. 401-408. 2001.

[8] Li, Jinyan, Kotagiri Ramamohanarao, and Guozhu Dong. "Combining the strength of pattern frequency and distance for classification." In Pacific-Asia Conference on Knowledge Discovery and Data Mining, pp. 455-466. Springer, Berlin, Heidelberg, 2001.

[9] Melluish, Thomas, Craig Saunders, Ilia Nouretdinov, and Vladimir Vovk. "The typicalness framework: a comparison with the Bayesian approach." University of London, Royal Holloway (2001).

[10] Zhou, Zhi-Hua, Shi-Fu Chen, and Zhao-Qian Chen. "A statistics based approach for extracting priority rules from trained neural networks." In Proceedings of the IEEE-INNS-ENNS International Joint Conference on Neural Networks. IJCNN 2000. Neural Computing: New Challenges and Perspectives for the New Millennium, vol. 3, pp. 401-406. IEEE, 2000.

[11] Birattari, Mauro, Gianluca Bontempi, and Hugues Bersini. "Lazy learning meets the recursive least squares algorithm." In Advances in neural information processing systems, pp. 375-381. 1999.

[12] Greig, D., T. Siegelmann, and M. Zibulevsky. "A New Class of Sigmoid Activation Functions That Don't Saturate." (1997).

[13] Fürnkranz, Johannes. "Pairwise classification as an ensemble technique." In European Conference on Machine Learning, pp. 97- 110. Springer, Berlin, Heidelberg, 2002.

[14] Brown, Christian T., Harry W. Bullen, Sean P. Kelly, Robert K. Xiao, Steven G. Satterfield, and John G. Hagedorn. "Visualization and Data Mining in an 3D Immersive Environment: Summer Project 2003." US National Institute of Standards and Technology (2003).