PREDICT THE ENERGY CONSUMPTION EFFICIENCY.

Dr.S .Krishnaveni

Assistant Professor ,Department of B.Com (Business Analytics)

PSGR Krishnammal College for Women, Coimbatore,India.

Krishnavenis@psgrkcw.ac.in

V.S .Santhiya

UG Scholor

Department of B.Com (Business Analytics)

PSGR Krishnammal College for Women, Coimbatore, India

Santhiyasandy1605@gmail.com

ABSTRACT

The paper mainly aims at the predict the energy consumption efficiency. The energy Consumption has been analysed for electric vehicles there might be a electric bikes and electric cars during the energy consumption have been analysed and predicted in this project. This analyse the energy consumption in the supply chain using the dataset and predictes the year, model and efficiency and gives a prediction. This is analysed using the Random Forest regressor visualization and decision tree.

Keywords- Electric vehicle (EV), machine learning (ML), random forest regression, Decision tree.

1.INTRODUCTION

Vehicles are now a days used by all around the world. From all that vehicles are comes with Petrol, Diesel etc, vehicle has hundreds of moving parts. Analysis of electric vehicles to show how vehicles were energy consumped. This paper determines and analyse the model efficiency with attributes introduced in dataset. The tool we used for this project is **"GOOGLE COLABATORY"** which makes the coding easier. This paper determines the year, model and efficiency Random forest regressor and decision tree which has been used to do simplest predictions.This helps in building the fast machine learning models that makes quick predictions as much as possible. Machine learning is a subset of artificial intelligence. This presents first machine learning tree , and then focuses on the matrix algebra methods in machine learning including single – objective optimization , feature selection ,principal component analysis and canonical analysis together with supervised , unsupervised , and semi-supervised learning and active learning . more importantly , this chapter highlights selected topics and advances in machine learning .

2.OBJECTIVE

The main objective of the paper is to find the predict the energy consumption efficiency and which the year and model are efficiency by using Random forest regressor algorithm and then predicting the result with the decision tree of the data. The random forest algorithm is used in this paper to analyse the data and visualize the values of the predicting data

3.RELATED WORK

Electric vehicles (EVs) have the potential to be operated using a clean, renewable energy source. However, a major limitation is their relatively short vehicle driving range and the associated driver 'range anxiety'. This research investigates the effect of gearing on energy consumption and driving range efficiency on an EV-converted Ford Focus using a chassis dynamometer in a controlled test environment in accordance with international standards. Two designs of the Ford Focus were used in the tests; one with an automatic gear drive, and the other with a manual gear drive. The electricity consumption of the two cars driving under different gearing configurations was measured under identical drive cycles. The vehicle range tests showed that measuring energy consumption on just two consecutive drive cycles on a calibrated chassis dynamometer will lead to a small overestimation of the energy consumption due to a 'cold' drive train. The results also suggest greater attention needs to be paid to EV battery charger efficiency, particularly in terms of standby energy consumption, which can increase the total energy required.

Energy-optimal route planning for electric vehicle (EV) is highly required for the wide-spread use of EV, which is hindered by limited battery capacity and relative short cruising range. Obtaining the cost for each link (i.e., link energy consumption) in road networks plays a key role in energy-optimal route planning process. The link energy consumption depends mainly on energy consumption factor, which is related to not only vehicle speed but also road type. This study aims to analyze the difference of EV's energy consumption factors for different road types. According to the floating car data (FCD) collected from the road network in Beijing, the vehicle specific power (VSP) distributions under different average travel speeds for different road types are analyzed firstly, and then the EV's energy consumption rates under different VSP-Bins are calculated. By using VSP as an intermediate variable, EV's energy consumption factor models for different road types are established and the difference of EV's energy consumption factors is analysed.

Experimental results highlight variations in EV range in the order of 50% when different levels of traffic congestion and road type are included in the analysis. The ability to estimate the energy requirements of the vehicle over a given route is also a pre-requisite for using an efficient charge blended control strategy within a PHEV. Experimental results show an accuracy within 20-30% when comparing predicted and measured energy consumptions for over 800 different real-world EV.

The proposed energy prediction framework employs a neural network and may be used either 'off-line' for better estimating the real-world range of the vehicle or 'on-line' integrated within the vehicle's energy management control system. The authors propose that this approach provides a more robust representation of the energy consumption of the target EVs compared to standard legislative test procedures. This is particularly pertinent for vehicle fleet operators that may use EVs within a specific environment, such as inner-city public transport or the use of urban delivery vehicles.

Therefore, energy consumption per capita of a country is regarded as an important indicator of economic development. In today's world, energy is not only considered to be a production input but is also regarded as a strategic commodity that constitutes the basis for international relations and shapes the world economy and politics. The conditions under which energy is procured and the problems experienced during the procurement process directly affect competition at both the national and international levels; these conditions also shape the production structures of the countries and constitute one of the main indicators of basic economic variables. For all of these reasons, energy is one of the most important issues in today's world

4.METHODOLOGY

The method used here is Random forest regressor algorithm , it provides high accuracy through cross validation and maintain the accuracy of a large proportion of data. By using this method here to predict the energy consumption of the values. The main aim of the paper is to find whether the efficiency of the energy. Random forest algorithm is a supervised machine learning algorithm to predicting the result. It is distinguished to know the relationship between the model and efficiency and predicted value. It is an ensemble method in which multiple trees are used as base regressor and the classification with the majority is chosen.

4.1 RANDOM FOREST ALGORITHM

Random forests or random decision forests are an ensemble learning method of classification, regression and other tasks that operates by constructing a multitude of decision trees at training time and outputting the class that is mode of the classes (classification) or model/ efficiency prediction(regressor) Random forests or random decision forests are an ensemble learning method of classification , regression and other tasks that operates by constructing a multitude of decision trees at training time and outputting the class that is the mode of the classes or model/efficiency prediction of the individual trees.

4.2 THE FOLLOWING STEPS ARE TO BE FOLLWED FOR WORKING THE RANDOM FOREST ALGORITHM

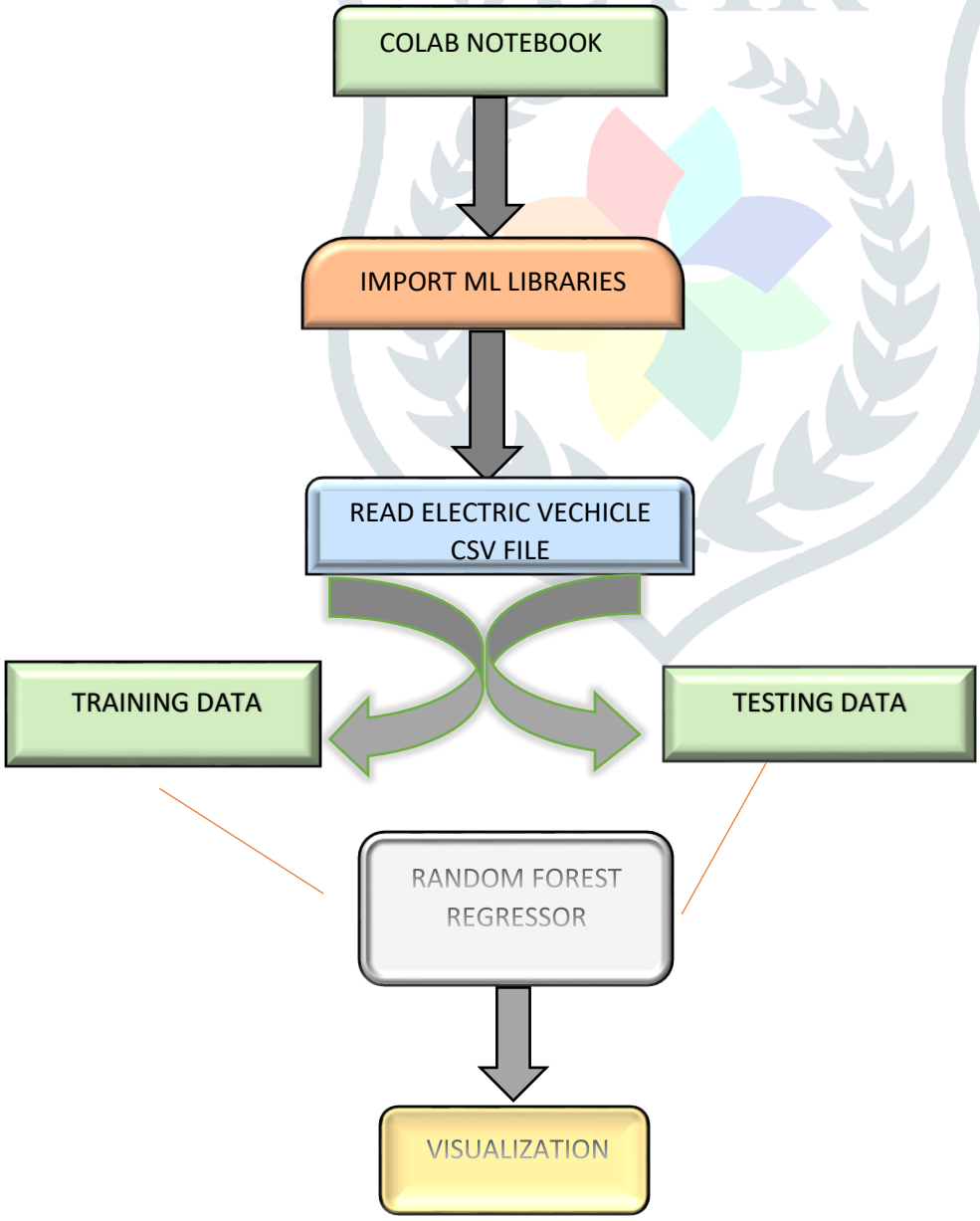
STEP1: Generate a dataset and download necessary packages.

STEP2: Split the dataset into test and training dataset Training set used to train the model.

STEP3: Visualization gives a better scope of interactivity of the algorithm to covey a betterunderstanding of the data set.

STEP4: Define a prediction value using Random forest regressor.

4.3 work flow process

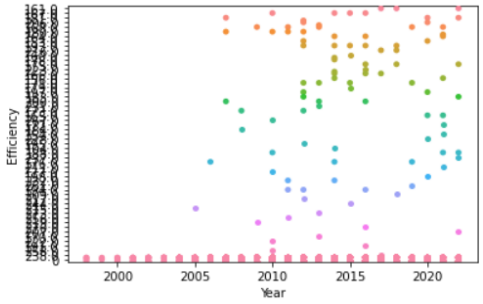


5.RESULT

✓ **Swarmplot**

```
sns.swarmplot(x='Year',y= 'Efficiency',data =df)
```

```
/usr/local/lib/python3.7/dist-packages/seaborn/categorical.py:1296: UserWarning: 33.3% of the points cannot be plac
  warnings.warn(msg, UserWarning)
/usr/local/lib/python3.7/dist-packages/seaborn/categorical.py:1296: UserWarning: 16.7% of the points cannot be plac
  warnings.warn(msg, UserWarning)
/usr/local/lib/python3.7/dist-packages/seaborn/categorical.py:1296: UserWarning: 25.0% of the points cannot be plac
  warnings.warn(msg, UserWarning)
/usr/local/lib/python3.7/dist-packages/seaborn/categorical.py:1296: UserWarning: 50.0% of the points cannot be plac
  warnings.warn(msg, UserWarning)
/usr/local/lib/python3.7/dist-packages/seaborn/categorical.py:1296: UserWarning: 99.6% of the points cannot be plac
  warnings.warn(msg, UserWarning)
<matplotlib.axes._subplots.AxesSubplot at 0x7f0258d836d0>
```



The above explains the spilt function in order to make the spilt and giving the values to the variables for x_year and y_efficiency prediction the value and fitting the model on electric vehicles data and trying to predict the attributes. To find year is increase according to year and analyze whether is model and efficiency is predicted the values of the accuracy score,2020 ,and matplotlib is imported pyplot in order to plot graphs of the data.

6.Conclusion

In this paper the electric vehicles is taken for the predicting values of model& efficiency is done by using Random forest regressor algorithm .Providing security the result of files are uploaded securely to the vehicles value of predicted .external includes price whereas internal includes the green energy consumption.

REFERENCES

[1]Yu, E.S.H. and Hwang, B.K. (1984), "The relationship between energy and GNP: further results", Energy Economics, Vol. 6 No. 3, pp. 186-190.

[2]Smulders, S. and De Nooij, M. (2003), "The impact of energy conservation on technology and economic growth", Resource and Energy Economics, Vol. 25 No. 1, pp. 59-79.

[3]Aydın, F.F. (2010), "Energy consumption and economic growth", Erciyes Üniversitesi _I _IBF Dergisi, Vol. 35, pp. 317-340.

[4]Baltagi, B.H., Feng, Q. and Kao, C. (2012), "A Lagrange multiplier test for cross section dependence in a fixed effects panel data model", Journal of Econometrics, Vol. 170 No. 1, pp. 164-177.

[5]Bataille, C., Jaccard, M., Nyboer, J. and Rivers, N. (2006), "Towards general equilibrium in a technologyrich model with empirically estimated behavioral parameters", The Energy Journal, Vol. 27, pp. 93-112.

[6]Berndt, E.R. and Wood, D.O. (1975), "Technology, prices, and the derived demand for energy", The Review of Economics and Statistics, Vol. 57 No. 3, pp. 259-268.

[7]Boyd, G.A. and Pang, J.X. (2000), "Estimating the linkage between energy efficiency and productivity", Energy Policy, Vol. 28 No. 5, pp. 289-296.

[8]Pesaran, M.H., Shin, Y. and Smith, R.P. (1999), "Pooled mean group estimation of dynamic heterogeneous panels", Journal of the American Statistical Association, Vol. 94 No. 446, pp. 621-634,

[9]Phillips, P.C.B. and Hansen, B.E. (1990), "Statistical inference in instrumental variables regression with I (1) processes", The Review of Economic Studies, Vol. 57 No. 1, pp. 99-125.

[10]Rivers, N. and Jaccard, M. (2006), "Useful models for simulating policies to induce technological change", Energy Policy, Vol. 34 No. 15, pp. 2038-2047.

[11]Sarıcı, V. and Sohtaoğlu, N.H. (2012), "Avrupa birliği üyesi ülkeler ile Türkiye'deki yapisal gelis melerin toplam nihai enerji yoğunluğuna etkileri", Dünya Enerji Konseyi Türk Milli Komitesi Türkiye 12, Enerji Kongresi, 14-16 Kasım.

[12]Saunders, H.D. (1992), "The Khazzoom-Brookes postulate and neoclassical growth", The Energy Journal, Vol. 13 No. 4, pp. 131-148.

[13]Schurr, S.H., Netschert, B.C., Eliasberg, V.F., Lerner, J. and Landsberg, H.H. (1960), Energy in the American Economy, 1850-1975: An Economic Study of its History and Prospects, Johns Hopkins Press, Baltimore,MD.

[14]Shiu, A. and Lam, P.L. (2004), "Electricity consumption and economic growth in china", Energy Policy, Vol. 32 No. 1, pp. 47-54.

[15]Odhiambo, N.M. (2009), "Energy consumption and economic growth nexus in Tanzania: an ARDL bounds testing approach", Energy Policy, Vol. 37 No. 2, pp. 617-622.

[16]Ozturk, I., Aslan, A. and Kalyoncu, H. (2010), "Energy consumption and economic growth relationship: evidence from panel data for low and middle income countries".

[17] Patterson, M.G. (1996), "What is energy efficiency?: Concepts, indicators and methodological issues", Energy Policy, Vol. 24 No. 5, pp. 377-390.