TO PREDICT FUTURE SCOPE OF ELECTRIC VEHICLES BASED ON PRICE

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Abstract :

The environmental friendly electric vehicles market is advancing in India. It is expected that a lot of the new light vehicles in the future will be electrical vehicles (EV). The storage capacity of these EVs has the potential to complement renewable energy resources and mitigate its intermittency. It has low running cost as they have less moving parts for maintaining and eco-friendly as they use no fossil fuels. In this paper, machine learning algorithm is used to find the accuracy. The project aims to analyze the past scenarios of electric vehicles price and year to predict the foreseeable future.

Keywords: Electric vehicles, Machine learning

I.Introduction

Electric vehicles manufacturing is on the way to the pinnacle of glory and its market share is also expected to rise . Several new companies are entering various parts of Electric Vehicles value chain . Industrial experts say soon there will be a mass adoption of electric vehicles . We might see more hybrid models in the near future. Although the electric vehicles industry expected the budget to be as groundbreaking as promised , it did not quite deliver on fronts. This has given rise to mixed sentiments in the industry . Surveys report that the price of electric vehicles will go down in two years to the price of petrol vehicles , even with low oil prices. Electric vehicles require maintenance free than conventional vehicles as there are fewer fluids like oil to change and fewer moving parts. The future of electric vehicles is said to be bright because they consume less electricity and pollution free .The paper aims at bringing out the impact of price on the future scope of electric vehicles .

II.OBJECTIVE

- To predict the future price trend of electric vehicles.
- To forecast the scope of electric vehicles prevalence in the future based on price.

III.RELATED WORKS

Bhanu kausik 2021,as electric vehicle manufacturing is becoming popular every day, its market share is also expected to rise greatly. Electric vehicle can oil import about $60 billion by 2030.Now 82% of oil demand is fulfilled by the import. So it is obvious how much helpful to the Indian economy will be if the import cost is reduced. Global transportation is going electric in very rapid base and such other possibility even with the electric vehicles industry in India. And Indian government is taken a goal of making 30% of all vehicles will be electric by 2030.Electric vehicle is India's future and it lowers running cost[1].

Jagriti Chandra, In march 2022 the minister of road transport and highways Nitin Gadkari spoke in the parliament about the increase in the number of electric vehicles. Between 2019-2020 and 2020-2021 the two wheeler electric rose by 422% ,three wheelers by 75%,four wheelers by 230% and number of electric busses increased by over a 1200%.The number of electric vehicles registered in 2021 is 1.7% of petrol and diesel vehicles registered in same year. So, he said it was important for the country to adopt alternate fuels to cut dependence on import of oil and it reduces import bill [2].

Bismah Malik 2021, India's electric vehicle is anticipate to increase at the compounded annual growth rate of 90 percent in the decade to touch $150 billion by 2030. The Indian electric vehicle market is currently in its start and it is estimated to grow at CAGR 90% from 2021 to 2030.The market is rapidly growing and is expected to be worth more. Electric vehicles helps to improve fuel economy ,it lowers fuel costs and it reduces emissions. Electric vehicles are now the future and has the ability to power us ahead. Today when the world is flourishing to use day by day new technology everywhere, Electric Vehicles must be the future means of transport. Pollution, growing demand for fuel, Global Warming, promoting eco-friendly means of transport are some of the reasons for promoting EV's. They are the means of transport that consume electric energy as fuel instead of traditional fuels such as petrol, diesel, and CNG [3].

Raghav Kalra, In recent times electric vehicle market is expected to be worth about atleast ₹ 475 billion by 2025.The penetration of electric two wheelers will reach upto 15% by 2025 from 1% currently. Electric vehicle market is the significant growth in the coming decade. Timothy Lipman ,Electric vehicles are experiencing the rise in popularity over the past few years because of the technology is matured and costs have declined and to support the clean transportation has promoted awareness to public, increased charging stations and facilitated electric vehicle adoption [4].

Electric vehicle is bright in India the difference in price between electric vehicles and gasoline cars is not high as you might expect, mainly since EV prices have been declining while the average gasoline price is increasing. The half of cost 51% of the electric vehicles is in the powertrain battery,motors.The price of lithium-ion batteries dropped 97% since economically introduced in 1991 [5].

In various governments in emerging economies have already said that they will give incentive shift to electric vehicles [6].In India ,the Modi government has set an goal to go 100% electric by 2030.India's oil import total dependence on crude oil imports is 86%,it means 14% of the nations energy requirements are met by the nation [7]. Global climate change and heat emissions are the influence of advanced artificial technology on self driving cars [8].The next revolution in the world of mobility is electric vehicles. It says that the developed countries are already making shift to e-vehicles [9].

As electric vehicle is cheaper in long run and also resource efficient, Government is continuously promoting the use of electric vehicles. Since long time many Indian and world trains including metros have been running on electricity. E-bike, E-car, E-rickshaw are already in market. Now people should use more electric vehicles in place of traditional petrol & diesel vehicles. Government has established campaign to promote use of electric vehicles. Some rebate on taxes and subsidy on purchasing the electric vehicles, are also provided by the Government [10].

IV.Methodology:

The method used here is random forest algorithm. It provides high accuracy for large proportion of data. It is a popular machine learning algorithm that belongs to the supervised learning technique ,made up of decision tree. The main aim of this paper is to predict the price .It is distinguished to know the accuracy of price and year.

STEP 1: Imported dataset from kaggle modified and saved in excel.csv format.
STEP 2: Preprocessing is done by removing all unwanted data .
STEP 3: The dataset is separated into training dataset and testing dataset.
STEP4: The visualization made for better understanding of dataset.
STEP5: Finding the accuracy of electric vehicles for price.

Work Flow

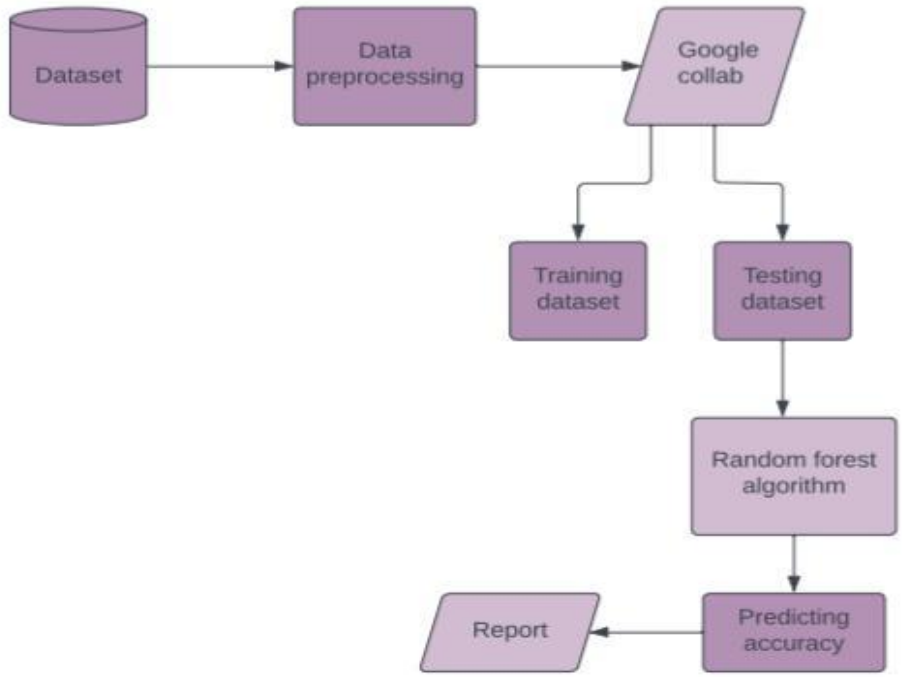

Fig:4.1

A.Data preprocessing:

The electric vehicle dataset is imported in collab.The electric vehicle dataset provides the data for the price,year,location,fueltype,power,mileage,efficiency, Kilometersdriven,sales,CO2 emissions. The electric vehicles dataset was collected between 1998-2022 from kaggle website. It is the technique of preparing , cleaning, organizing the data and making the suitable machine learning models. The drop is used to remove the specified row or column. And the random forest algorithm is used to predict the price.

B.Random forest algorithm:

It is a supervised machine learning algorithm it uses ensemble learning method for regression. It is a technique that combines prediction from multiple machine learning algorithms to make more accurate predictions. It combines multiple algorithm of the same type that is multiple decision tree resulting in random forest. A machine learning model was developed to predict the price and year of an electric vehicles.
Random forest algorithm predicts the output with high accuracy even for the large datasets and it runs more efficiently. The data is collected by the pre processing method. From sklearn model train and test set is used, and the train and test set is splitted.Then the regressor object is created and predicted the accuracy rate .And the decision tree is displayed as output. It builds decision tree on dissimilar samples and takes the high vote for classification and to find the average for regression.

V.Result

Accuracy rate:

```
[ ]   #Mean Absolute Error(MAE)
      from sklearn.metrics import mean_absolute_error
      print("MAE: ",mean_absolute_error(y_test,y_pred))

    MAE:  76.59743202416918
```

```
[ ]   #Mean Squared Error(MSE)
      from sklearn.metrics import mean_squared_error
      print("MSE: ",mean_squared_error(y_test,y_pred))

    MSE:  3318457.5358761325
```

```
[ ]   #Root Mean Squared Error(RMSE)
      print("RMSE: ",np.sqrt(mean_squared_error(y_test,y_pred)))

    RMSE:  1821.6633980722488
```

```
[ ]   #R Squared (R2)
      from sklearn.metrics import r2_score
      r2 = r2_score(y_test,y_pred)
      print("R2: ",r2)

    R2:  0.9617703402047184
```

Fig.5.1

Here, predicting the values and getting model performances of R2 score. The MAE and MSE calculates the difference between predicted values and actual values. The accuracy displays as 96% of price and year of electric vehicles.

Random forest decision tree:

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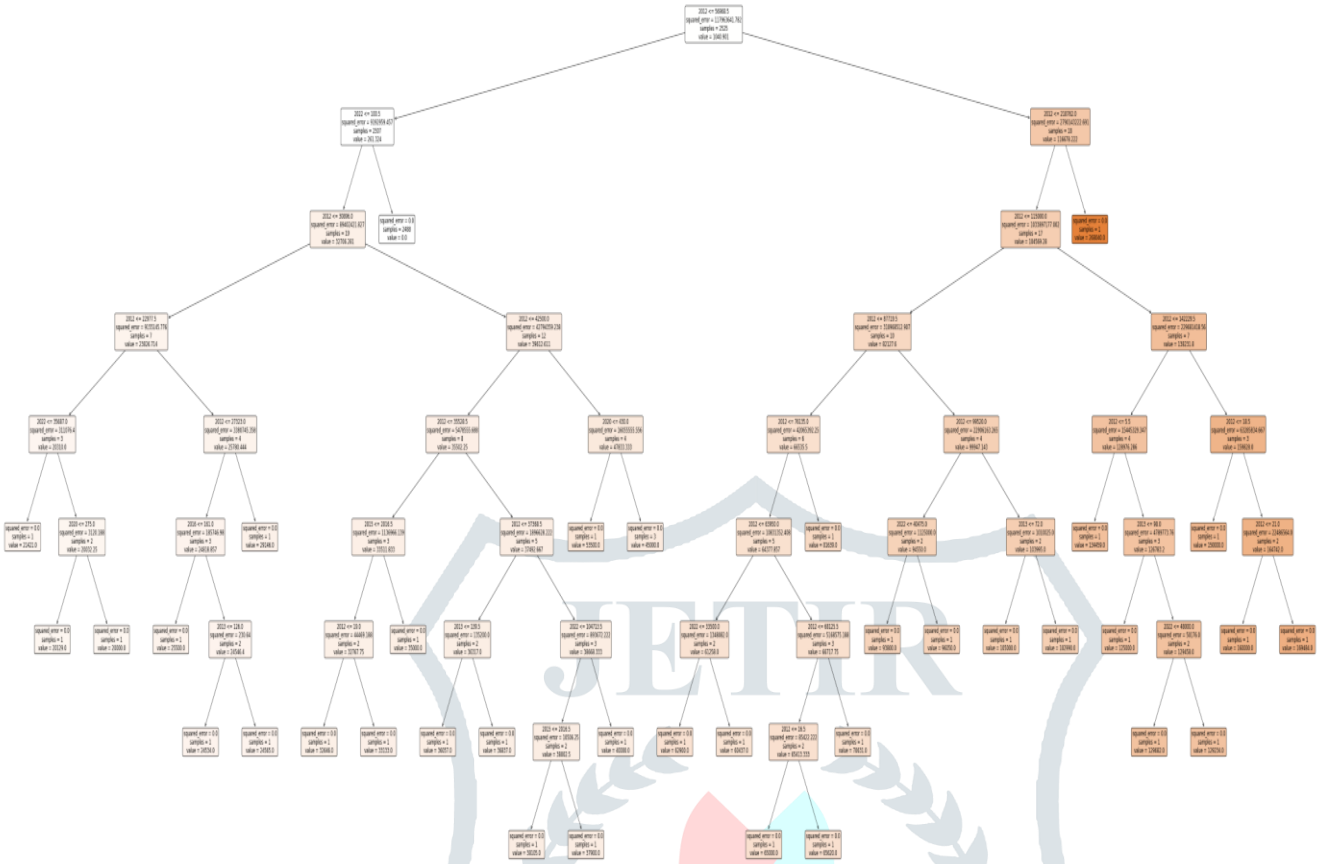

Fig.5.2

The decision tree is used to predict the accuracy of price and year. It shows that various outcomes from a series of decisions.

VI.CONCLUSION AND FURTHER WORK

In this paper, used to analyze and find the accuracy of electric vehicles based on price. More developed and developing countries have become more active in electric vehicle introduction and diffusion. The electric vehicles market will be popular in future. So, it is evident that the price of the electric vehicles go down as the production increases and people will switch to electric vehicling in the near future.

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