Analyzing and Predicting Importance of Electric Vehicles in Improving Green Energy

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ABSTRACT:

Across the globe, governments have been tackling the concerning problem of air-polluting emissions by committing significant resources to improving air quality. Achieving the goal of air purification will require that both the private and public sectors invest in clean energy technology. It will also need a transition from conventional houses to smart houses and from conventional vehicles to electric vehicles (EVs). It will be necessary to integrate renewable energy sources (RESs) such as solar photovoltaics, wind energy systems and diverse varieties of bioenergies. In addition, there are opportunities for decarbonisation within the transportation sector itself. Paradoxically, it appears that the same transportation sector might also present an opportunity for a speedy decarbonisation. Statistics indicate that transportation is responsible for 14% of global greenhouse gas (GHG) emissions. However, there are numerous options for viable clean technology, including the plug-in electric vehicles (PEVs). There are indeed many technologies and strategies, which reduce transportation emissions such as public transportation, vehicle light weighing, start-stop trains, improved engine technology, fuel substitution and production improvement, hydrogen, power-to-gas, and natural gas heavy fleets. This work concentrates on EV adoption integrated with RES. Specifically, this chapter examines the feasibility of significantly reducing GHG emissions by integrating EVs with RESs for sustainable mobility.

Keywords:

- Electric Vehicles(EVs)
- Renewable Energy Source(RESs)
- Solar Photovoltaic Energy(PEVs)
- Wind Energy
- Vehicle Fleet
- Pollutant Emission’

I .INTRODUCTION:

Electric vehicles (EV)' uptake has been promoted around the globe for the benefits EVs are expected to bring in terms of energy security, global and local environment, and economical growth. Energy security is potentially improved as battery electric vehicles (BEV) and plug-in hybrid vehicles (PHEV) reduce the oil consumption of countries traditionally relying heavily on foreign imports. Impacts on global climate change from the transport sector can be reduced if the road transports electrification occurs in parallel with the decarbonisation of power generation. Local air pollution, especially in urban areas, can be reduced as higher fraction of driven miles is carried by zero tailpipe emissions vehicles such as BEVs. Economic growth can be stimulated by the development of an EV production supply chain as well as by deployment of the charging infrastructure and the development of business to operate it.

Along with the expected benefits, large scale EV deployment poses both a challenge and an opportunity for the operation of power grids. On one hand electric grids capacity can be strained by an unmanaged EV load, especially at the distribution level where the capacity bottlenecks are most easily reached. On the other, if charging demand flexibility can be harnessed by implementing smart charging strategies, not only can costly grid capacity upgrades be minimised, but the operation of grid systems can be enhanced making use of a potentially very large responsive storage constituted by the batteries of grid-connected EVs.

EV deployment impacts, being on the energy security, the environment, the economy or on grid system operations have been indentified, studied and quantified mainly by means of mathematical models. Such models are necessary essentially for two reasons. Firstly, real world data about EV use is scarce due to the low adoption levels to date. Secondly, and most importantly, even when data is available, models need to be developed to assess impacts in conditions that do not necessarily coincide with those described by the available data, including the testing of new technological and policy scenarios. In fact, real world EV use data, collected in most cases during demonstration projects or trials, have been analysed mainly descriptively in few studies . These descriptive analyses help gain qualitative insight into EV use and charging behaviour, but they essentially draw a picture of the status quo. As a matter of fact, such static pictures are of limited use in the rapidly evolving context of transport electrification which requires tools that are sufficiently flexible to inform decisions in a rapidly changing context. Such flexibility is enabled only by models.

Here review the approaches adopted to model electric vehicle use and changing patterns across a variety if impacts studies published in transport, energy and power sector journals. Across the sectors the modelling approaches are widely diverse. This diversity makes it difficult to compare the analyses' results from different studies. Because the focus of impact studies is not demand itself, but the impacts of EV deployment, there is a lack of critical analysis of the approaches used to model the demand of EV use, which is in fact the essential input of impact analyses. The diverse approaches for EV use demand modelling are organised in the present paper by means of a classification framework that enables to indentify the weakness and strengths in each approach with respect to the scope of the impact studies.

II. RELATED WORK:

Electric vehicles first came in existence in the mid-19 cemary, when electricity was among the preferred methods for motor vehicle propulsion providing a level of comfort and ease of operation that could not be achieved by the gasoline cars of the time[11]. The ma combustion imgine (ICE) is the dominant propulsion method for motor vehicles but electic power has become commonplace in other vehicle types, such as trains and smaller vecies of types

Electric vehicles had many advantages over their competitors Changing gears on gasoline can was the most difficult part of driving Electric vehicles did not require gear change While steam-powered cars also had no gear shifting, they suffered from long start-up times of up to 45 minutes on cold mornings. The steam cars had less range before needing water, compared to an electric car's range on a single charge. The only good roads of the period were in town which meant that most commutes were local, a perfect situation for electric vehicles since their range was limited. The electric vehicle was the preferred choice of many because it did not require manual effort to start, as with the hand crank on gasoline vehicles, and there was no wrestling with a gear shifter[11]

Today when the world is looking for new technology everywhere, Electric Vehicles must be the future means of transport. Pollution, growing demand for fuel, Global Warming and 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.

The world population is increasing drastically day by day and the demand for means of transport is also growing proportionally. Thus demand for fuel is also increasing. EV will reduce the dependency of a nation on petroleum export countries. This will reduce the import cost of petrol, diesel like fuels which will help the growing economy of the country. Cost of electric vehicles is also low when comparing the recurring expenditure on petrol and diesel used in traditional.

III . METHODOLOGY:

3.1.TESTING FUNDAMENTALS:

Logistic regression algorithm is one of the most popular supervised machine learning techniques used for predicting the categorical dependent variable using a given set of independent variables. It predicts the output of categorical dependent variables. It gives the probabilistic values which lie between “0 and 1” or “YES /NO”. Logistic regression is also used for solving classification problems.To implement the Logistic Regression, first data Preprocessing is done. Then fitting Logistic regression to the training set next is to predict the test result and then finding the test accuracy of the result. Finally visualizing the test set result.

3.2.IMPLEMENTATION:

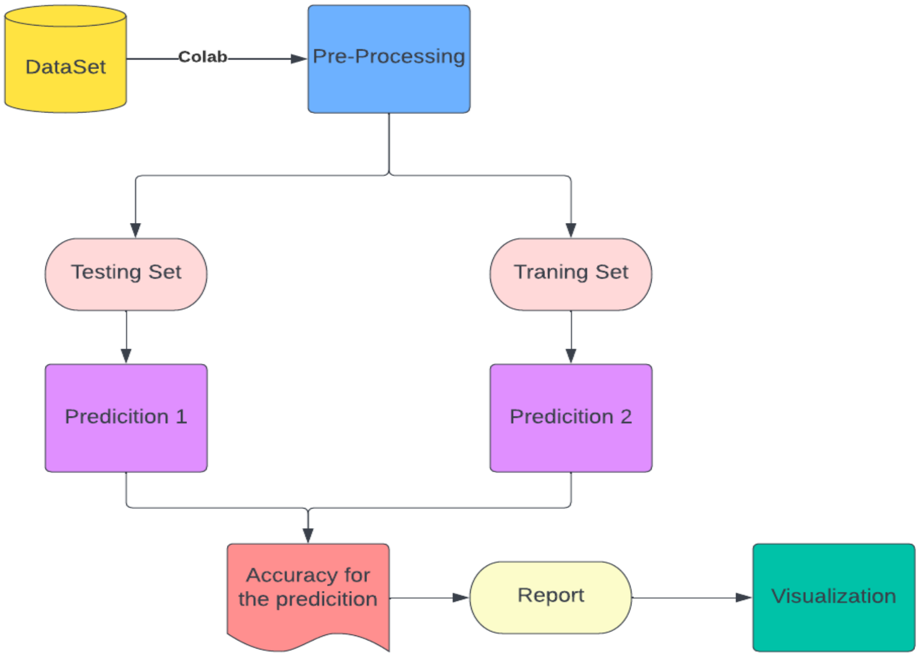
- Logistic regression algorithm is used for predicting the categorical dependent variable using a given set of independent variables.
- Apriori Algorithm is a classifier that contains a number of decision trees on various subsets of the given dataset and takes the average to improve the predictive accuracy of that dataset.
- The main moto of this study is to show the importance of Electric vehicle in improving green energy.

3.3.Improvements:

Following are the ways to improve the efficiency of the algorithm:

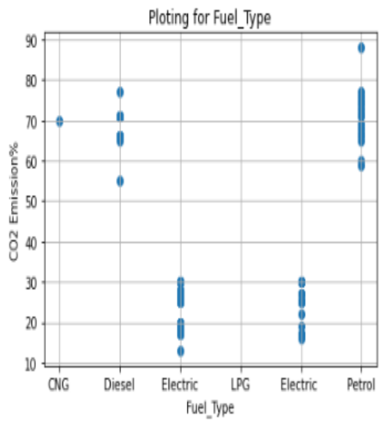
- Use hashing techniques to reduce the number of database scans.
- Do not take the infrequent transaction further into consideration.
- If a purchase is frequent in one partition, it should be frequent in another partition.
- Try to pick up random samples to improve the accuracy of your algorithm.
- Use dynamic itemset counting to introduce new candidate itemsets while the scanning of the database is performed.

3.4.Work Flow:


DataSet
Colab
Pre-Processing
Testing Set
Traning Set
Predicition 1
Predicition 2
Accuracy for the predicition
Report
Visualization

3.5. Result:

```
[ ] plt.scatter(data['Fuel_Type'],data['CO2 Emission%'])
    plt.xlabel("Fuel_Type")
    plt.ylabel("CO2 Emission%")
    plt.title("Ploting for Fuel_Type")
    plt.grid()
```




```
[ ] #SYMPTOMS
    #accuracy for Symptoms
    metrics.accuracy_score(test_Y1,predicted_value)
    #prediction using symptoms
    pd.DataFrame({'predicted_value':predicted_value_2,'KnowO/P':test_Y1})
```

	predicted_value	KnowO/P
51	60000	52000
484	60000	52000
2524	60000	101000
5584	60000	24300
1631	60000	32838
...	...	...
1341	60000	40500
430	60000	30000
4038	60000	72717
1857	60000	96000
3378	60000	42883

1806 rows × 2 columns

```
[ ] for item in association_results:

        # first index of the inner list
        # Contains base item and add item
        pair = item[0]
        items = [x for x in pair]
        print("Rule: " + items[0] + " -> " + items[1])

        #second index of the inner list
        print("Support: " + str(item[1]))

        #third index of the list located at 0th
        #of the third index of the inner list

        print("Confidence: " + str(item[2][0][2]))
        print("Lift: " + str(item[2][0][3]))
        print("=====================================")
```

```
Rule: 1 -> 17
Support: 0.004818076092374148
Confidence: 0.45312499999999994
Lift: 4.427531452922078
=====================================
Rule: Electric -> 1
Support: 0.008140887190563216
Confidence: 0.7656249999999999
Lift: 18.214612154150196
-------------------------------------
```

IV .CONCULSION:

EVs represent one of the best promising technologies for green and sustainable transportation systems. The high penetration of EVs will have positive effects and benefits such as lesser fossil fuel reliance, significant reduction of GHG and toxic pollutant emissions, as well as the capability to contribute in the integration of renewable energy into existing electric grids. This chapter reviewed the latest advances related to the interaction and integration of EVs with RESs such as wind energy, solar photovoltaics and EV coordination for sustainable mobility in significantly reducing air pollution. Some key concerns and possible solutions were also discussed in detail. The successful implementation of the coupling EV-RES technology includes and requires the full contribution of government, power utilities, EV and aggregators manufactures, policy-makers and owners. It is expected that this study can assist all involved parties to better understand the challenges and issues and contribute further to this field.

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