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A Data Analysis Project — Electric Vehicle Population data

Exploratory Data Analysis of EVs in the USA

Kaminisky Mahendra · Follow
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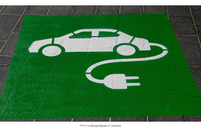

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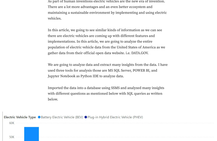
In I discussed in one of my earlier articles (i.e. **Sale of Green Powers to Extending Human Lifespan**. Where I discussed the importance of the usage and production of electricity wisely will lead us to several advantages and benefits to many aspects of our lives.

As part of human innovations electric vehicles are the new era of innovation. There are a lot more advantages and an even better ecosystem and maintaining a sustainable environment by implementing and using electric vehicles.

In this article, we going to analyze data and extract many insights from the data. I have used three tools for analysis those are MS SQL Server, POWER BI, and Jupyter Notebook on Python IDE to analyze data.

Imported the data into a database using SSMS and analyzed many insights with different questions as mentioned below with SQL queries as written below.



Top 10 models, image designed by author's Kaminisky Mahendra

- Find out the makers and who made how many models from the data set and order by the number of models.
- Find out the makers and who made how many distinct models from the data set and order by number of models.
- Find out the number of models from the data set made by Volvo.
- Find a distinct number of models made by different makers in different cities and find several records from this.

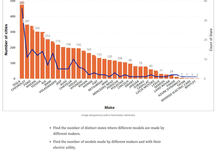


Image designed by author's Kaminisky Mahendra

- Find the number of distinct states where different models are made by different makers.
- Find the number of models made by different makers and with their electric utility.

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- Find the number of models made by Honda or Tesla with different electric utilities.
- Find a distinct number of models made by different makers arranged rank wise in a descending manner.
- Write a query that returns the city, postal code, and number of makers remaining the city and postal code.
- Write an SQL query that returns the makers and model year with several distinct models concerning their year of model and makers in descending order.

To use all SQL queries in my **GitHub repository**.

```
--Find out the no of model and of makers in a table made by Tesla
select count(distinct [Make],[Electric_Vehicle_Population_Data].dbo.[Electric_Vehicle_Population_D

--Find out the no of makers and from and model in
select count(distinct [Make]),[Electric_Vehicle_Population_Data].dbo.[Electric_Vehicle_Population_D

--Find out the different models made by Tesla*/

select distinct model
from dbo.[Electric_Vehicle_Population_Data]
where make='TESLA'

--Find out the different makes made by the c.  'TESLA'
select distinct make
from dbo.[Electric_Vehicle_Population_Data]
where make='TESLA'

--Find out the total no of different models from the dataset.
select count(distinct model)
from dbo.[Electric_Vehicle_Population_Data]

--Find out the different no of makers from the data set.
select count(distinct make)
from dbo.[Electric_Vehicle_Population_Data]

--Find out the makers made from the data set.
select distinct make,count(distinct model)
from dbo.[Electric_Vehicle_Population_Data]

--Find out the makers and and make how many models made from the data set and o
select make, count(model) as no_of_models
from dbo.[Electric_Vehicle_Population_Data]
group by make
order by count(model) desc

--Find out the makers and and make how many distinct models of models from the data
select make, count(distinct model) as no_of_models
from dbo.[Electric_Vehicle_Population_Data]
group by make
order by count(distinct model) desc

--Find out the no of cities from the data set.
select count(distinct [City],[Electric_Vehicle_Population_Data]

--Find out the no of models from the data set made by Volvo.
select count(distinct [City],[Electric_Vehicle_Population_Data] where make='Volvo'

--Find distinct no of models made by different makers in different cities and fi
select make,count(distinct model),[City],[Electric_Vehicle_Population_Data]
where count(distinct model)=1
group by make,[City]
order by count(distinct model) desc

--Write a query that returns the city, postal code, and no of makers with remai
select [City],[Postal_Code],count(distinct make)
from dbo.[Electric_Vehicle_Population_Data]

--Write a SQL query that returns the makers and model year with of distinct
--in descending order.
select make,[Model_Year],count(distinct model) as no_of_models
from dbo.[Electric_Vehicle_Population_Data]
group by make,[Model_Year] order by [Model_Year] desc, count(distinct model) desc
```

These are the SQL queries that we can write to extract insights from the given data while raising many questions.

Let's see a big picture of data analysis using **Power BI**. Here is the dashboard image that you can see and observe many things from the dashboard.

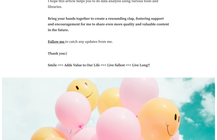

Image designed by author Kaminisky Mahendra.

See the Power BI dashboard file from my **GitHub repository**.

Now we will use Python pandas for data analysis using Jupyter Notebook as IDE.

See the Python script file from my **GitHub repository**.

```
#Import the libraries before importing the libraries install pandas and numpy pa
#in a cmd prompt before importing the pandas and numpy library to analyze the data

import pandas as pd
import numpy as np

# Downloaded the file and used that file path to read the file using pandas.
# Assigned the file path to variable and read the file using variable name.

file_city_ev_models=r'C:/Users/Mahendra/Desktop/Ev Models/Electric_Vehicle_Popu

file_city_ev_models_df=pd.read_csv(file_city_ev_models)
file_city_ev_models_df.info()<class'pandas.core.frame.DataFrame'>

RangeIndex: 177865 entries, 0 to 177864
Data columns (total 17):
 #   Column                               Non-Null Count  Dtype
---  ------                               --------------  -----
 0   VIN (1-10)                           177865 non-null  object
 1   County                               177861 non-null  object
 2   City                                 177861 non-null  object
 3   State                                177865 non-null  object
 4   Postal Code                          177861 non-null  int64
 5   Model Year                           177865 non-null  int64
 6   Make                                 177865 non-null  object
 7   Model                                177865 non-null  object
 8   Electric Vehicle Type                177865 non-null  object
 9   Clean Alternative Fuel Vehicle (CAFV) 177865 non-null  object
 10  Electric Range                       177865 non-null  int64
 11  Base MSRP                            177865 non-null  int64
 12  Legislative District                 177846 non-null  float64
 13  DOL Vehicle ID                       177865 non-null  int64
 14  Vehicle Location                     177861 non-null  object
 15  Electric Utility                     177861 non-null  object
 16  2020 Census Tract                    177865 non-null  int64
dtypes: int64(7), object(10)
memory usage: 23.1 MB

postal_code=file_city_ev_models_df['Postal Code']
postal_code.nunique()1,200

postal_code=file_city_ev_models_df['Postal Code']
postal_code.unique()array([98354, 98250, 98168, ...,
98362, 98327, 98373, 98372, 98371, 98374, 98375, 98376, 98377, 98378,
98379, 98380, 98381, 98382, 98383, 98384, 98385, 98386, 98387, 98388,
98389, 98390, 98391, 98392, 98393, 98394, 98395, 98396, 98397, 98398,
98399, 98400, 98401, 98402, 98403, 98404, 98405, 98406, 98407, 98408,
98409, 98410, 98411, 98412, 98413,
```

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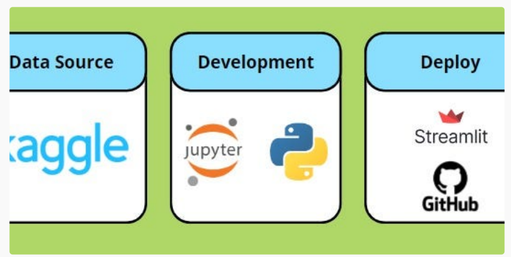

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