Exploratory Data Analysis on Electric Vehicle

Introduction :

This project focuses on the Exploratory Data Analysis (EDA) of electric vehicle data, providing insights into the distribution and trends of EVs across various manufacturers, states, and years. The analysis is divided into three key tasks:

1. Task 1: Univariate and Bivariate Analysis
   We explore key variables like Electric Range, Base MSRP, and EV Manufacturer (Make). This involves plotting distributions (histogram), relationships (scatter plots), and comparisons across categories (box plots) to understand EV characteristics.
2. Task 2: Choropleth Map
   A Choropleth map visualizes the geographic distribution of electric vehicles across the United States, using vibrant colors to display the number of EVs per state, offering geographical insights into EV adoption.
3. Task 3: Racing Bar Plot
   A dynamic Racing Bar Plot shows the rise in popularity of different EV manufacturers over time. This animation illustrates how various manufacturers have gained market share across the years.

Task 1:

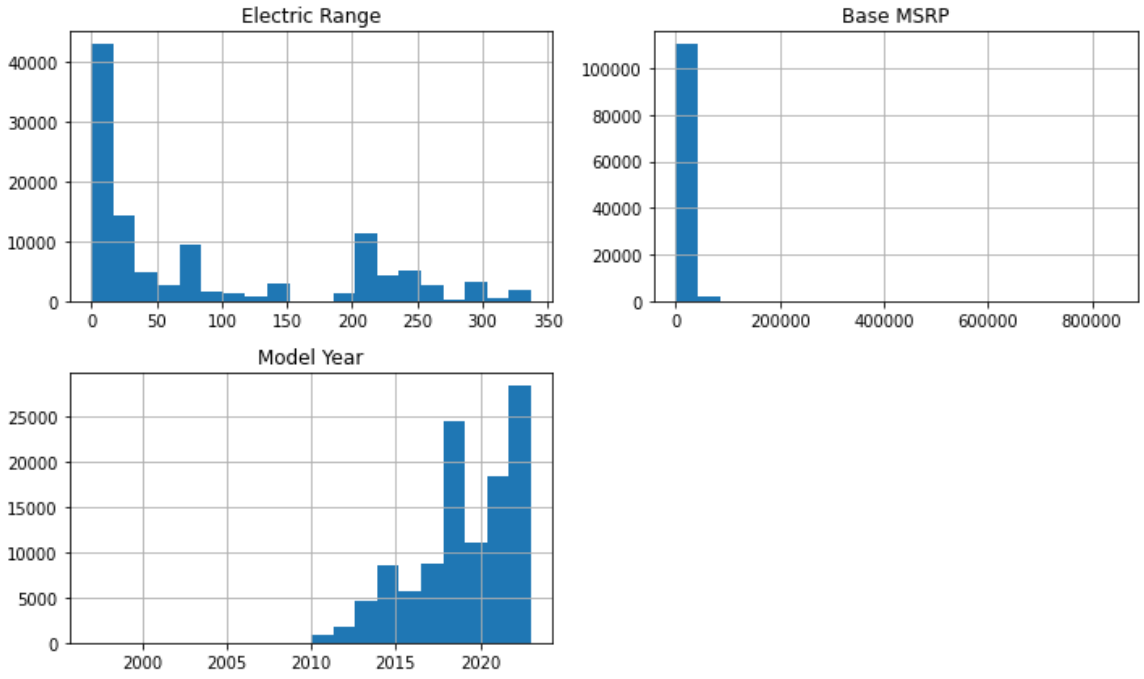
This is an open ended problem. Apply Exploratory Data Analysis (Univariate and Bivariate) on the dataset available above.

1. Univariate Analysis:

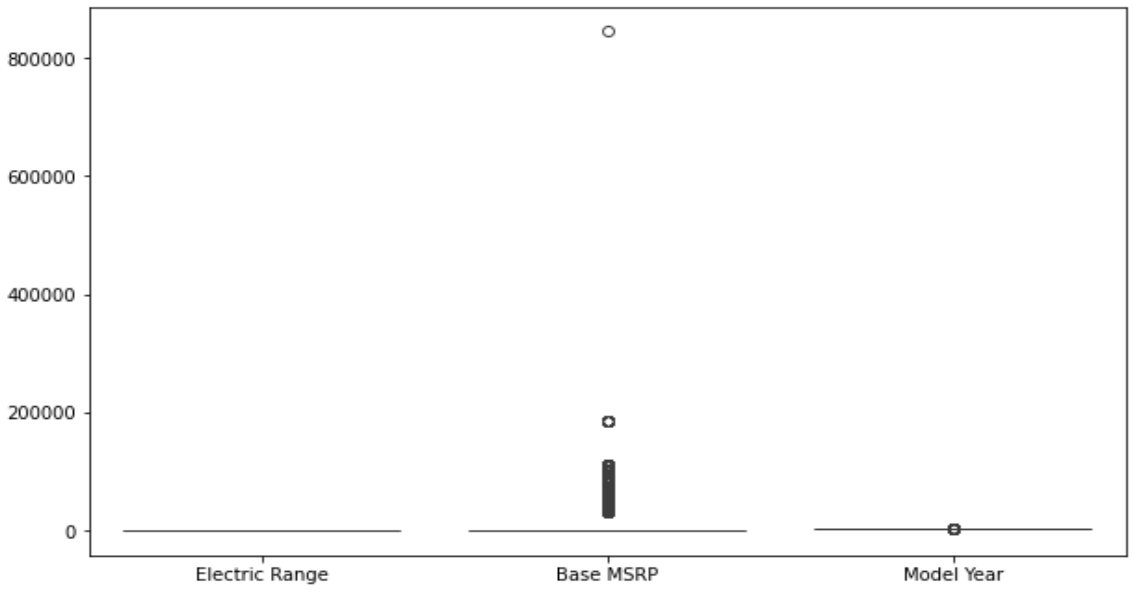
1.1 Numerical columns (Electric Range, Base MSRP, Model Year) :

	Electric Range	Base MSRP	Model Year
count	112634.000000	112634.000000	112634.000000
mean	87.812987	1793.439681	2019.003365
std	102.334216	10783.753486	2.892364
min	0.000000	0.000000	1997.000000
25%	0.000000	0.000000	2017.000000
50%	32.000000	0.000000	2020.000000
75%	208.000000	0.000000	2022.000000
max	337.000000	845000.000000	2023.000000

1.2 Histograms for numerical columns :



1.3 Box plot for numerical columns to detect outliers :

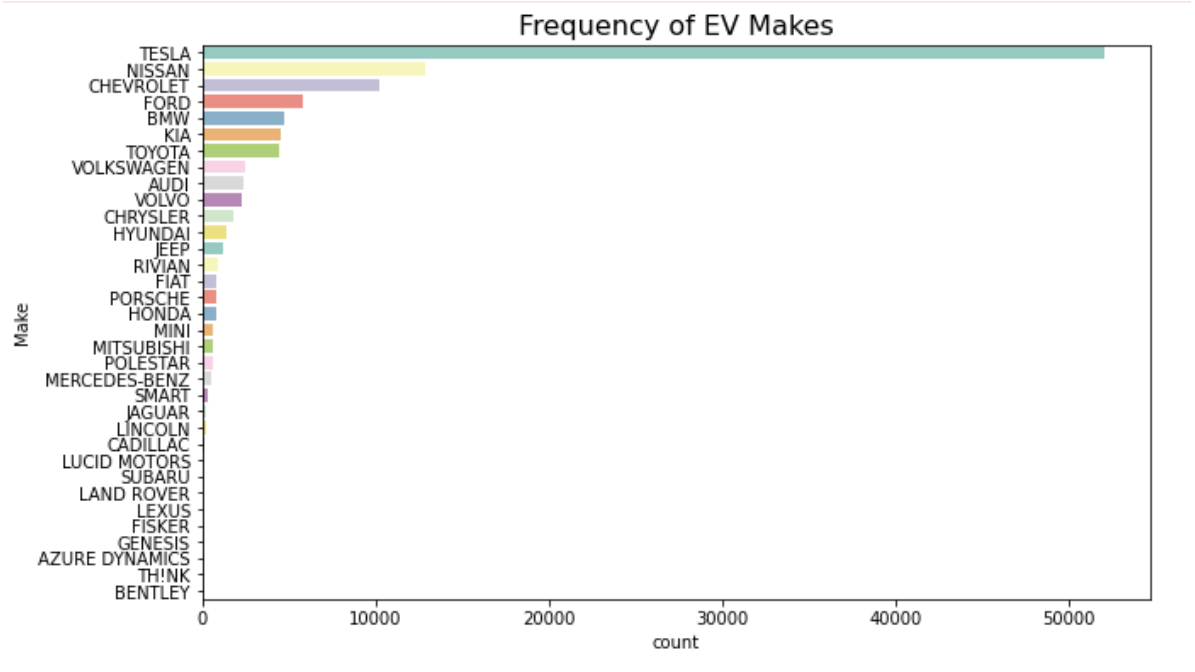


1.4 Categorical columns (Make, Electric Vehicle Type, State) :

```
Make
TESLA                52078
NISSAN               12880
CHEVROLET            10182
FORD                  5819
BMW                   4680
KIA                   4483
TOYOTA                4405
VOLKSWAGEN            2514
AUDI                  2332
VOLVO                 2288
CHRYSLER              1794
HYUNDAI               1412
JEEP                  1152
RIVIAN                 885
FIAT                   822
PORSCHE                818
HONDA                  792
MINI                   632
MITSUBISHI             588
POLESTAR               558
MERCEDES-BENZ          506
SMART                  273
JAGUAR                 219
LINCOLN                168
CADILLAC               108   FISKER                20
LUCID MOTORS            65   GENESIS               18
SUBARU                  59   AZURE DYNAMICS         7
LAND ROVER              38   TH!NK                  3
LEXUS                   33   BENTLEY                3
FISKER                  20   Name: count, dtype: int64
Electric Vehicle Type
Battery Electric Vehicle (BEV)            86044
Plug-in Hybrid Electric Vehicle (PHEV)    26590
```

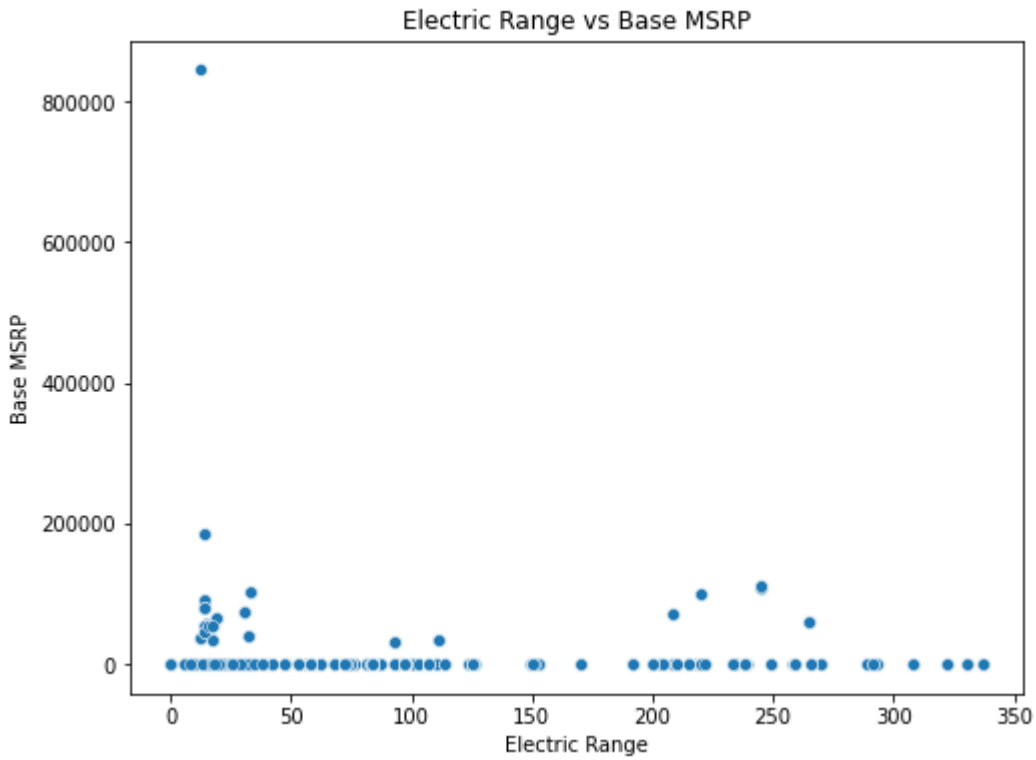
State			
WA	112348		
CA	76	MO	3
VA	36	PA	3
MD	26	MA	3
TX	14	LA	3
CO	9	NJ	3
NV	8	NH	2
GA	7	OH	2
NC	7	WY	2
CT	6	ID	2
DC	6	KY	1
FL	6	RI	1
AZ	6	ME	1
IL	6	MN	1
SC	5	SD	1
OR	5	WI	1
NE	5	NM	1
HI	4	AK	1
UT	4	MS	1
AR	4	AL	1
NY	4	DE	1
TN	3	OK	1
KS	3	ND	1

1.5 1.5 Bar plot for categorical columns :

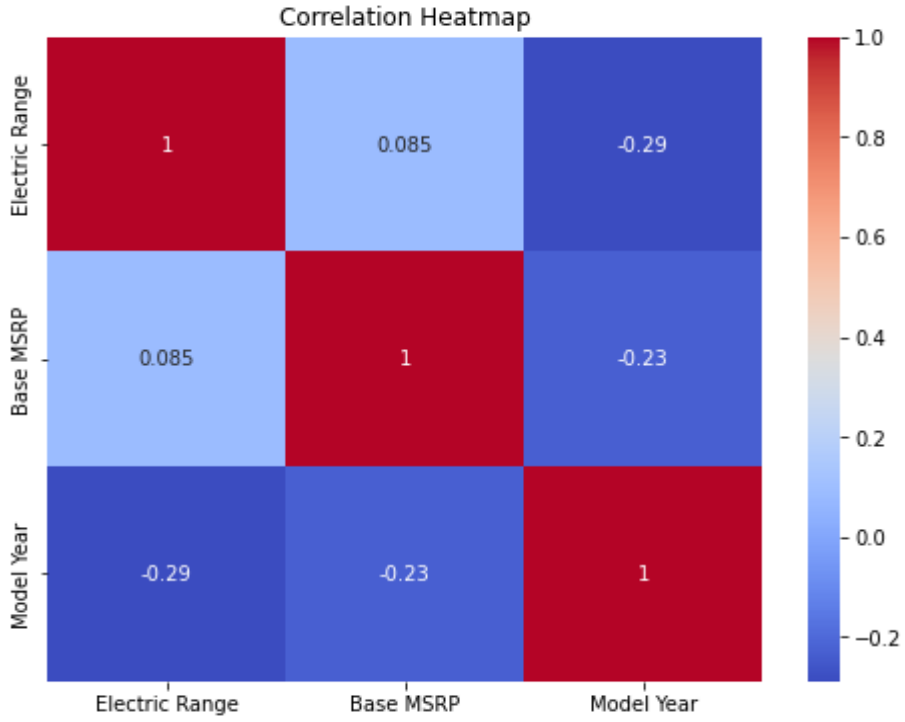


2 . Bivariate Analysis :

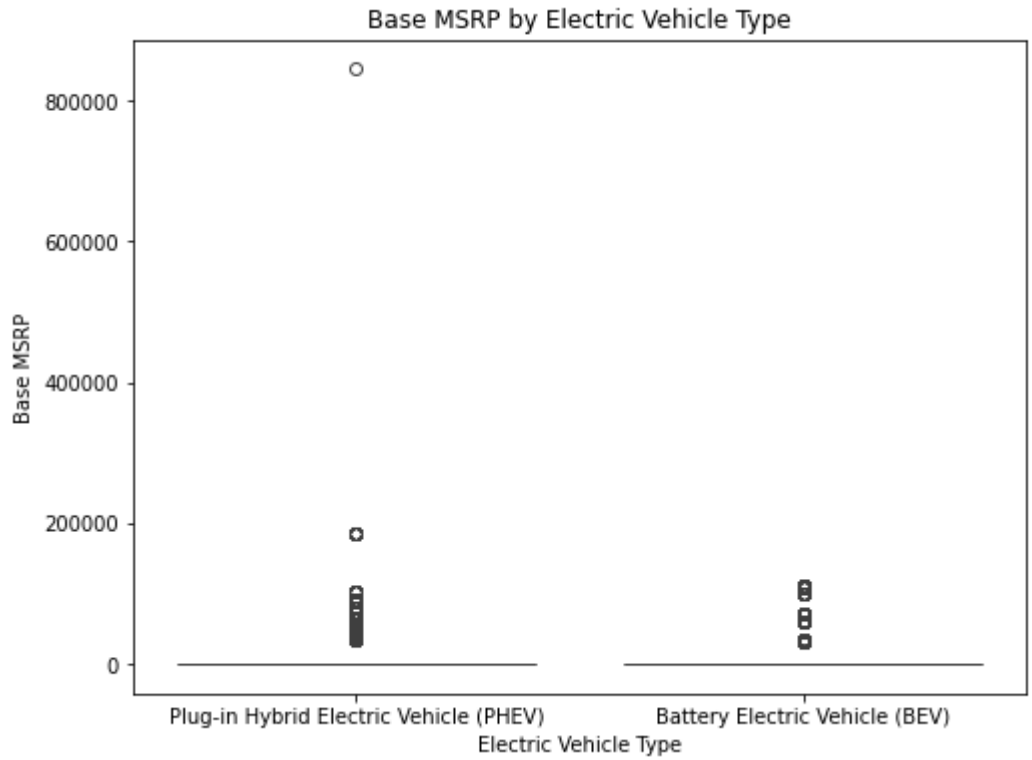
2 .1 Scatter plot between Electric Range and Base MSRP :



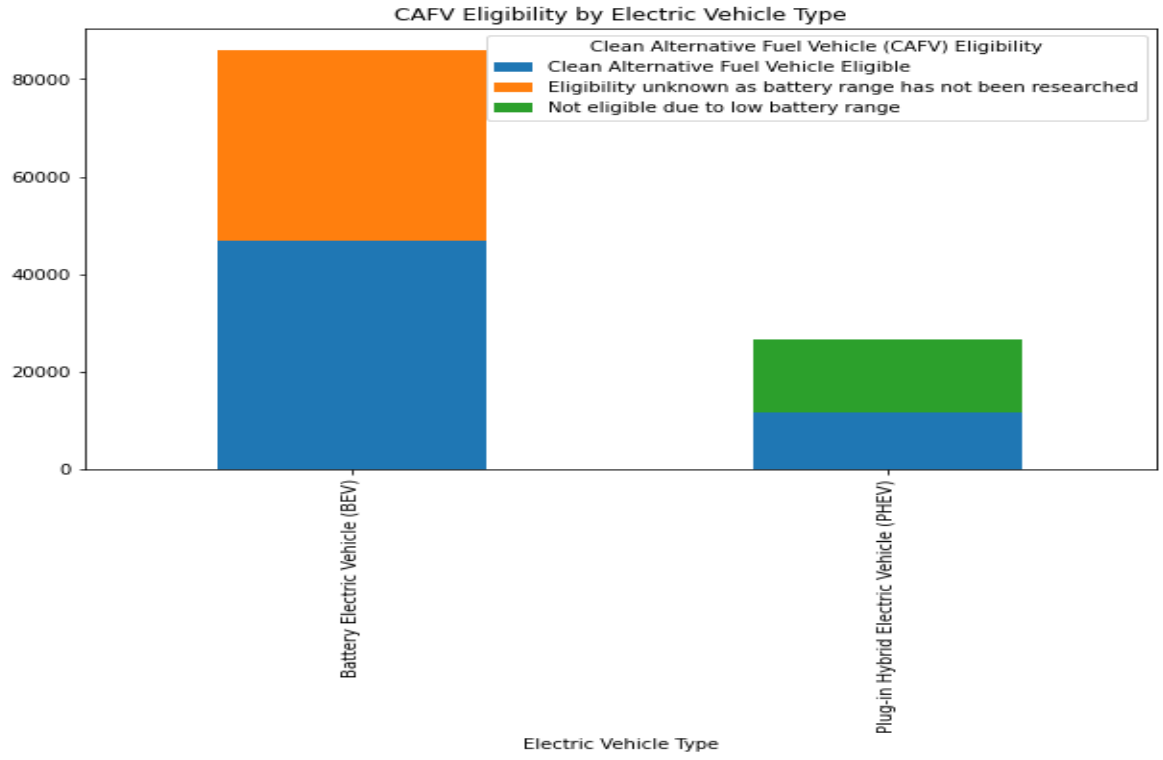
2 .2 Correlation heatmap between numerical columns:



2 .3 Box plot of Base MSRP by Electric Vehicle Type :



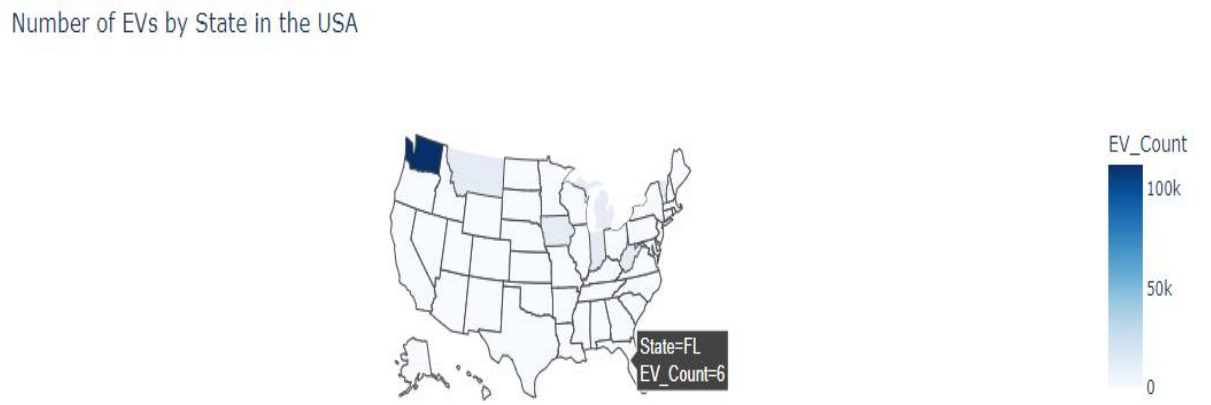
2 .4 Stacked bar plot for Electric Vehicle Type vs CAFV Eligibility :



Task 2 :–

Create a Choropleth using plotly.express to display the number of EV vehicles based on location :

Choropleth by State :



Task 3 :-

Enhanced Racing Bar Plot for EV Make and Year :