Car dataset analysis

January 23, 2024

1 Working on Real Project with Python (cars Dataset)

(A Part of Big Data Analyst)

Cars Dataset

Cars Dataset Here, the data of Differenr is given with their specifications.¶ this data is availables as CSV file, we are going to analysze this data set using the pandas DataFrame.

```
[1]: import pandas as pd
     car=pd.read_csv(r"C:\Users\Dell\Desktop\Car Data Analyst\car.csv")
```

```
[2]: car
```

```
[2]:          Make                        Model   Type  Origin DriveTrain      MSRP  \
     0       Acura                          MDX    SUV    Asia        All   $36,945
     1       Acura                RSX Type S 2dr  Sedan   Asia      Front   $23,820
     2       Acura                     TSX 4dr   Sedan   Asia      Front   $26,990
     3       Acura                      TL 4dr   Sedan   Asia      Front   $33,195
     4       Acura                   3.5 RL 4dr  Sedan   Asia      Front   $43,755
     ..        …                          …       …       …          …
     423     Volvo   C70 LPT convertible 2dr   Sedan  Europe      Front   $40,565
     424     Volvo   C70 HPT convertible 2dr   Sedan  Europe      Front   $42,565
     425     Volvo               S80 T6 4dr   Sedan  Europe      Front   $45,210
     426     Volvo                      V40   Wagon  Europe      Front   $26,135
     427     Volvo                     XC70   Wagon  Europe        All   $35,145

            Invoice  EngineSize  Cylinders  Horsepower  MPG_City  MPG_Highway  \
     0      $33,337         3.5        6.0         265        17           23
     1      $21,761         2.0        4.0         200        24           31
     2      $24,647         2.4        4.0         200        22           29
     3      $30,299         3.2        6.0         270        20           28
     4      $39,014         3.5        6.0         225        18           24
     ..        …           …          …           …         …            …
     423    $38,203         2.4        5.0         197        21           28
     424    $40,083         2.3        5.0         242        20           26
     425    $42,573         2.9        6.0         268        19           26
     426    $24,641         1.9        4.0         170        22           29
     427    $33,112         2.5        5.0         208        20           27
```

1

```
       Weight  Wheelbase  Length
0        4451        106     189
1        2778        101     172
2        3230        105     183
3        3575        108     186
4        3880        115     197
..        ...        ...     ...
423      3450        105     186
424      3450        105     186
425      3653        110     190
426      2822        101     180
427      3823        109     186

[428 rows x 15 columns]
```

[5]: `car.isnull().sum()`

```
[5]: Make          0
     Model         0
     Type          0
     Origin        0
     DriveTrain    0
     MSRP          0
     Invoice       0
     EngineSize    0
     Cylinders     2
     Horsepower    0
     MPG_City      0
     MPG_Highway   0
     Weight        0
     Wheelbase     0
     Length        0
     dtype: int64
```

2   1. Instruction (For data Cleaning)

Find all Null Values in the dataset. If there is any null values in any columns ,then fill the mean of that columns.

[10]: `car.Cylinders.isnull().sum()`

[10]: 2

[11]: `car.Cylinders.mean()`

[11]: 5.807511737089202

```
[13]: car.Cylinders.fillna(car.Cylinders.mean(),inplace=True)
```

```
[14]: car.Cylinders.isnull().sum()
```

```
[14]: 0
```

```
[15]: car.isnull().sum()
```

```
[15]: Make          0
      Model         0
      Type          0
      Origin        0
      DriveTrain    0
      MSRP          0
      Invoice       0
      EngineSize    0
      Cylinders     0
      Horsepower    0
      MPG_City      0
      MPG_Highway   0
      Weight        0
      Wheelbase     0
      Length        0
      dtype: int64
```

3 2. Questions (Based on value counts)

Check what are different type of make are there in our dataset. And what is the count (Occurrence) of each Make I the data ?

```
[17]: car.Make.unique()
```

```
[17]: array(['Acura', 'Audi', 'BMW', 'Buick', 'Cadillac', 'Chevrolet',
             'Chrysler', 'Dodge', 'Ford', 'GMC', 'Honda', 'Hummer', 'Hyundai',
             'Infiniti', 'Isuzu', 'Jaguar', 'Jeep', 'Kia', 'Land Rover',
             'Lexus', 'Lincoln', 'MINI', 'Mazda', 'Mercedes-Benz', 'Mercury',
             'Mitsubishi', 'Nissan', 'Oldsmobile', 'Pontiac', 'Porsche', 'Saab',
             'Saturn', 'Scion', 'Subaru', 'Suzuki', 'Toyota', 'Volkswagen',
             'Volvo'], dtype=object)
```

```
[18]: car.Make.nunique()
```

```
[18]: 38
```

```
[21]: car.Make.value_counts()
```

```
[21]: Make
      Toyota          28
      Chevrolet       27
      Mercedes-Benz   26
      Ford            23
      BMW             20
      Audi            19
      Honda           17
      Nissan          17
      Volkswagen      15
      Chrysler        15
      Dodge           13
      Mitsubishi      13
      Volvo           12
      Jaguar          12
      Hyundai         12
      Subaru          11
      Pontiac         11
      Mazda           11
      Lexus           11
      Kia             11
      Buick            9
      Mercury          9
      Lincoln          9
      Saturn           8
      Cadillac         8
      Suzuki           8
      Infiniti         8
      GMC              8
      Acura            7
      Porsche          7
      Saab             7
      Land Rover       3
      Oldsmobile       3
      Jeep             3
      Scion            2
      Isuzu            2
      MINI             2
      Hummer           1
      Name: count, dtype: int64
```

```python
[32]: # with filter

      car[(car["Origin"]=="Asia") | (car["Origin"]=="Europe")]
```

```
[32]:      Make            Model  Type  Origin DriveTrain    MSRP  \
      0    Acura           MDX    SUV   Asia       All  $36,945
```

```
1      Acura              RSX Type S 2dr   Sedan    Asia      Front   $23,820
2      Acura                     TSX 4dr   Sedan    Asia      Front   $26,990
3      Acura                      TL 4dr   Sedan    Asia      Front   $33,195
4      Acura                  3.5 RL 4dr   Sedan    Asia      Front   $43,755
..       …          …              …        …        …          …
423    Volvo   C70 LPT convertible 2dr   Sedan   Europe      Front   $40,565
424    Volvo   C70 HPT convertible 2dr   Sedan   Europe      Front   $42,565
425    Volvo                  S80 T6 4dr   Sedan   Europe      Front   $45,210
426    Volvo                         V40   Wagon   Europe      Front   $26,135
427    Volvo                        XC70   Wagon   Europe        All   $35,145

       Invoice   EngineSize   Cylinders   Horsepower   MPG_City   MPG_Highway  \
0      $33,337          3.5         6.0          265         17            23
1      $21,761          2.0         4.0          200         24            31
2      $24,647          2.4         4.0          200         22            29
3      $30,299          3.2         6.0          270         20            28
4      $39,014          3.5         6.0          225         18            24
..         …           …           …            …          …             …
423    $38,203          2.4         5.0          197         21            28
424    $40,083          2.3         5.0          242         20            26
425    $42,573          2.9         6.0          268         19            26
426    $24,641          1.9         4.0          170         22            29
427    $33,112          2.5         5.0          208         20            27

       Weight   Wheelbase   Length
0        4451         106      189
1        2778         101      172
2        3230         105      183
3        3575         108      186
4        3880         115      197
..        …           …        …
423      3450         105      186
424      3450         105      186
425      3653         110      190
426      2822         101      180
427      3823         109      186

[281 rows x 15 columns]
```

```
[35]: ###    with isin funtion
      car[car.Origin.isin(["Asia","Europe"])]
```

```
[35]:        Make                Model    Type   Origin DriveTrain      MSRP  \
      0      Acura                 MDX     SUV     Asia        All   $36,945
      1      Acura       RSX Type S 2dr   Sedan    Asia      Front   $23,820
      2      Acura              TSX 4dr   Sedan    Asia      Front   $26,990
      3      Acura               TL 4dr   Sedan    Asia      Front   $33,195
```

```
4      Acura                3.5 RL 4dr  Sedan     Asia      Front  $43,755
..       …                          …      …        …          …        …
423   Volvo   C70 LPT convertible 2dr  Sedan  Europe    Front  $40,565
424   Volvo   C70 HPT convertible 2dr  Sedan  Europe    Front  $42,565
425   Volvo               S80 T6 4dr  Sedan  Europe    Front  $45,210
426   Volvo                      V40  Wagon  Europe    Front  $26,135
427   Volvo                     XC70  Wagon  Europe      All  $35,145

        Invoice  EngineSize  Cylinders  Horsepower  MPG_City  MPG_Highway  \
0      $33,337         3.5        6.0         265        17           23
1      $21,761         2.0        4.0         200        24           31
2      $24,647         2.4        4.0         200        22           29
3      $30,299         3.2        6.0         270        20           28
4      $39,014         3.5        6.0         225        18           24
..         …           …          …           …         …            …
423    $38,203         2.4        5.0         197        21           28
424    $40,083         2.3        5.0         242        20           26
425    $42,573         2.9        6.0         268        19           26
426    $24,641         1.9        4.0         170        22           29
427    $33,112         2.5        5.0         208        20           27

        Weight  Wheelbase  Length
0         4451        106     189
1         2778        101     172
2         3230        105     183
3         3575        108     186
4         3880        115     197
..          …          …       …
423       3450        105     186
424       3450        105     186
425       3653        110     190
426       2822        101     180
427       3823        109     186

[281 rows x 15 columns]
```

4 4. instruction (Removing unwanted record)

Remove all the record (rows) where weight is above 4000.

```
[41]: (car.Weight>4000).sum()
```

```
[41]: 103
```

```
[40]: (car["Weight"]>4000).sum()
```

```
[40]: 103
```

```
[42]: car.Weight>4000
```

```
[42]: 0        True
      1       False
      2       False
      3       False
      4       False
            ...
      423     False
      424     False
      425     False
      426     False
      427     False
      Name: Weight, Length: 428, dtype: bool
```

```
[43]: car
```

```
[43]:        Make                   Model    Type  Origin DriveTrain       MSRP  \
      0      Acura                    MDX     SUV    Asia        All    $36,945
      1      Acura          RSX Type S 2dr   Sedan   Asia      Front    $23,820
      2      Acura               TSX 4dr     Sedan   Asia      Front    $26,990
      3      Acura                TL 4dr     Sedan   Asia      Front    $33,195
      4      Acura             3.5 RL 4dr    Sedan   Asia      Front    $43,755
      ..       ...                    ...     ...      ...        ...
      423    Volvo  C70 LPT convertible 2dr  Sedan  Europe     Front    $40,565
      424    Volvo  C70 HPT convertible 2dr  Sedan  Europe     Front    $42,565
      425    Volvo             S80 T6 4dr    Sedan  Europe     Front    $45,210
      426    Volvo                  V40     Wagon  Europe     Front    $26,135
      427    Volvo                  XC70    Wagon  Europe       All    $35,145

             Invoice  EngineSize  Cylinders  Horsepower  MPG_City  MPG_Highway  \
      0      $33,337         3.5        6.0         265        17           23
      1      $21,761         2.0        4.0         200        24           31
      2      $24,647         2.4        4.0         200        22           29
      3      $30,299         3.2        6.0         270        20           28
      4      $39,014         3.5        6.0         225        18           24
      ..         ...         ...        ...         ...       ...          ...
      423    $38,203         2.4        5.0         197        21           28
      424    $40,083         2.3        5.0         242        20           26
      425    $42,573         2.9        6.0         268        19           26
      426    $24,641         1.9        4.0         170        22           29
      427    $33,112         2.5        5.0         208        20           27

             Weight  Wheelbase  Length
      0        4451        106     189
      1        2778        101     172
      2        3230        105     183
```

```
3        3575      108     186
4        3880      115     197
..        …        …       …
423      3450      105     186
424      3450      105     186
425      3653      110     190
426      2822      101     180
427      3823      109     186

[428 rows x 15 columns]
```

[45]: `car[~car.Weight>4000,]`

[45]:
```
Empty DataFrame
Columns: [Make, Model, Type, Origin, DriveTrain, MSRP, Invoice, EngineSize,
Cylinders, Horsepower, MPG_City, MPG_Highway, Weight, Wheelbase, Length]
Index: []
```

[46]: `car`

[46]:
```
        Make                    Model    Type  Origin DriveTrain     MSRP  \
0       Acura                      MDX     SUV    Asia        All  $36,945
1       Acura          RSX Type S 2dr   Sedan    Asia      Front  $23,820
2       Acura             TSX 4dr Sedan   Asia      Front  $26,990
3       Acura              TL 4dr   Sedan    Asia      Front  $33,195
4       Acura          3.5 RL 4dr   Sedan    Asia      Front  $43,755
..        …                      …       …       …          …        …
423     Volvo  C70 LPT convertible 2dr   Sedan  Europe      Front  $40,565
424     Volvo  C70 HPT convertible 2dr   Sedan  Europe      Front  $42,565
425     Volvo             S80 T6 4dr   Sedan  Europe      Front  $45,210
426     Volvo                     V40   Wagon  Europe      Front  $26,135
427     Volvo                    XC70   Wagon  Europe        All  $35,145

      Invoice  EngineSize  Cylinders  Horsepower  MPG_City  MPG_Highway  \
0     $33,337         3.5        6.0         265        17           23
1     $21,761         2.0        4.0         200        24           31
2     $24,647         2.4        4.0         200        22           29
3     $30,299         3.2        6.0         270        20           28
4     $39,014         3.5        6.0         225        18           24
..        …           …          …           …         …            …
423   $38,203         2.4        5.0         197        21           28
424   $40,083         2.3        5.0         242        20           26
425   $42,573         2.9        6.0         268        19           26
426   $24,641         1.9        4.0         170        22           29
427   $33,112         2.5        5.0         208        20           27

      Weight  Wheelbase  Length
```

```
0      4451         106      189
1      2778         101      172
2      3230         105      183
3      3575         108      186
4      3880         115      197
..      …           …        …
423    3450         105      186
424    3450         105      186
425    3653         110      190
426    2822         101      180
427    3823         109      186

[428 rows x 15 columns]
```

[51]: `car[car["Weight"]>4000]`

[51]:
```
            Make                          Model     Type  Origin DriveTrain  \
0          Acura                            MDX      SUV    Asia        All
15          Audi  A4 3.0 Quattro convertible 2dr   Sedan  Europe        All
17          Audi           A6 4.2 Quattro 4dr      Sedan  Europe        All
18          Audi           A8 L Quattro 4dr        Sedan  Europe        All
20          Audi                     RS 6 4dr     Sports  Europe      Front
..           …                            …          …      …          …
401   Volkswagen                  Touareg V6       SUV  Europe        All
411   Volkswagen                 Phaeton 4dr     Sedan  Europe      Front
412   Volkswagen             Phaeton W12 4dr     Sedan  Europe      Front
415   Volkswagen                   Passat W8     Wagon  Europe      Front
416        Volvo                     XC90 T6       SUV  Europe        All

           MSRP   Invoice  EngineSize  Cylinders  Horsepower  MPG_City  \
0       $36,945  $33,337         3.5        6.0         265        17
15      $44,240  $40,075         3.0        6.0         220        18
17      $49,690  $44,936         4.2        8.0         300        17
18      $69,190  $64,740         4.2        8.0         330        17
20      $84,600  $76,417         4.2        8.0         450        15
..          …        …           …          …           …         …
401     $35,515  $32,243         3.2        6.0         220        15
411     $65,000  $59,912         4.2        8.0         335        16
412     $75,000  $69,130         6.0       12.0         420        12
415     $40,235  $36,956         4.0        8.0         270        18
416     $41,250  $38,851         2.9        6.0         268        15

       MPG_Highway  Weight  Wheelbase  Length
0               23    4451        106     189
15              25    4013        105     180
17              24    4024        109     193
18              24    4399        121     204
```

```
20              22    4024         109    191
..              …     …            …      …
401             20    5086         112    187
411             22    5194         118    204
412             19    5399         118    204
415             25    4067         106    184
416             20    4638         113    189

[103 rows x 15 columns]
```

[54]: `car[~(car["Weight"]>4000)]`

[54]:
```
        Make                        Model    Type  Origin DriveTrain      MSRP  \
1       Acura              RSX Type S 2dr    Sedan    Asia      Front   $23,820
2       Acura                     TSX 4dr    Sedan    Asia      Front   $26,990
3       Acura                      TL 4dr    Sedan    Asia      Front   $33,195
4       Acura                  3.5 RL 4dr    Sedan    Asia      Front   $43,755
5       Acura   3.5 RL w/Navigation 4dr    Sedan    Asia      Front   $46,100
..      …                           …        …       …          …         …
423     Volvo  C70 LPT convertible 2dr    Sedan  Europe      Front   $40,565
424     Volvo  C70 HPT convertible 2dr    Sedan  Europe      Front   $42,565
425     Volvo                  S80 T6 4dr    Sedan  Europe      Front   $45,210
426     Volvo                         V40    Wagon  Europe      Front   $26,135
427     Volvo                        XC70    Wagon  Europe        All   $35,145

        Invoice  EngineSize  Cylinders  Horsepower  MPG_City  MPG_Highway  \
1       $21,761         2.0        4.0         200        24           31
2       $24,647         2.4        4.0         200        22           29
3       $30,299         3.2        6.0         270        20           28
4       $39,014         3.5        6.0         225        18           24
5       $41,100         3.5        6.0         225        18           24
..          …           …          …           …          …            …
423     $38,203         2.4        5.0         197        21           28
424     $40,083         2.3        5.0         242        20           26
425     $42,573         2.9        6.0         268        19           26
426     $24,641         1.9        4.0         170        22           29
427     $33,112         2.5        5.0         208        20           27

        Weight  Wheelbase  Length
1         2778        101     172
2         3230        105     183
3         3575        108     186
4         3880        115     197
5         3893        115     197
..          …          …       …
423       3450        105     186
424       3450        105     186
```

```
425    3653         110       190
426    2822         101       180
427    3823         109       186

[325 rows x 15 columns]
```

5   5 instructions (Applying funtion on a column)

increase all the values of " MPG_City" column by 3

```
[61]: car["MPG_City"]=car["MPG_City"].apply(lambda x:x+3)
```

6

```
[62]: car
```

```
[62]:         Make                    Model    Type  Origin DriveTrain      MSRP  \
      0      Acura                      MDX     SUV    Asia        All  $36,945
      1      Acura           RSX Type S 2dr   Sedan    Asia      Front  $23,820
      2      Acura                  TSX 4dr   Sedan    Asia      Front  $26,990
      3      Acura                   TL 4dr   Sedan    Asia      Front  $33,195
      4      Acura               3.5 RL 4dr   Sedan    Asia      Front  $43,755
      ..       …                        …       …       …         …
      423    Volvo   C70 LPT convertible 2dr  Sedan  Europe      Front  $40,565
      424    Volvo   C70 HPT convertible 2dr  Sedan  Europe      Front  $42,565
      425    Volvo               S80 T6 4dr   Sedan  Europe      Front  $45,210
      426    Volvo                      V40   Wagon  Europe      Front  $26,135
      427    Volvo                     XC70   Wagon  Europe        All  $35,145

             Invoice  EngineSize  Cylinders  Horsepower  MPG_City  MPG_Highway  \
      0      $33,337         3.5        6.0         265        20           23
      1      $21,761         2.0        4.0         200        27           31
      2      $24,647         2.4        4.0         200        25           29
      3      $30,299         3.2        6.0         270        23           28
      4      $39,014         3.5        6.0         225        21           24
      ..          …           …          …           …         …            …
      423    $38,203         2.4        5.0         197        24           28
      424    $40,083         2.3        5.0         242        23           26
      425    $42,573         2.9        6.0         268        22           26
      426    $24,641         1.9        4.0         170        25           29
      427    $33,112         2.5        5.0         208        23           27

             Weight  Wheelbase  Length
      0        4451        106     189
      1        2778        101     172
      2        3230        105     183
```

```
3      3575          108       186
4      3880          115       197
..      …            …          …
423     3450         105       186
424     3450         105       186
425     3653         110       190
426     2822         101       180
427     3823         109       186

[428 rows x 15 columns]
```

[ ]: