lec6 exploratory data analysis

In [1]:

```
import sys
import os
import pandas as pd
import numpy as np
```

In [2]:

```
cars_data=pd.read_csv('Toyota.csv',index_col=0,na_values=['??','????'])
```

In [3]:

```
cars_data2=cars_data.copy(deep=True)
```

In [4]:

```
pd.crosstab(index=cars_data2['FuelType'],#row
            columns='count', #col
            dropna=True)
```

Out[4]:

col_0	count
FuelType	
CNG	15
Diesel	144
Petrol	1177

In [5]:

```
pd.crosstab(index=cars_data2['Automatic'],#0-manual ,1=automatic
            columns=cars_data2['FuelType'],
            dropna=True)
```

Out[5]:

FuelType	CNG	Diesel	Petrol
Automatic			
0	15	144	1104
1	0	0	73

In [6]:

```
#joint probabilaty is the likelihood of two independent events happening a
t the same time
pd.crosstab(index=cars_data2['Automatic'],#0-manual ,1=automatic
            columns=cars_data2['FuelType'],
            normalize=True,#all the values to proposition or probability
            dropna    =True)
```

Out[6]:

FuelType	CNG	Diesel	Petrol
Automatic			
0	0.011228	0.107784	0.826347
1	0.000000	0.000000	0.054641

In [7]:

```
#marginal probability is the probability of the occurrence of the single e
vent
pd.crosstab(index=cars_data2['Automatic'],#0-manual ,1=automatic

            columns=cars_data2['FuelType'],
            normalize=True,#all the values to proposition or probability
            margins   =True, #sum of rows and columns
            dropna    =True)
```

Out[7]:

FuelType	CNG	Diesel	Petrol	All
Automatic				
0	0.011228	0.107784	0.826347	0.945359
1	0.000000	0.000000	0.054641	0.054641
All	0.011228	0.107784	0.880988	1.000000

In [8]:

```
#Conditional probability is the probability of an event ( A ), given that
 another event ( B ) has already occurred
#Given the type of gear box, probability of different fuel type
pd.crosstab(index=cars_data2['Automatic'],#0-manual ,1=automatic
            columns=cars_data2['FuelType'],
            margins   =True, #sum of rows and columns
            dropna    =True, #drop all nan values
            normalize='index') #index =1
```

Out[8]:

FuelType	CNG	Diesel	Petrol
Automatic			
0	0.011876	0.114014	0.874109
1	0.000000	0.000000	1.000000
All	0.011228	0.107784	0.880988

In [9]:

```
#Conditional probability is the probability of an event ( A ), given that
 another event ( B ) has already occurred
#Given the type of gear box, probability of different fuel type
pd.crosstab(index=cars_data2['Automatic'],#0-manual ,1=automatic
            columns=cars_data2['FuelType'],
            margins   =True, #sum of rows and columns
            dropna    =True, #drop all nan values

            normalize='columns') #columns=1
```

Out[9]:

FuelType	CNG	Diesel	Petrol	All
Automatic				
0	1.0	1.0	0.937978	0.945359
1	0.0	0.0	0.062022	0.054641

In [10]:

```
numerical_data=cars_data2.select_dtypes(exclude=[object])
print(numerical_data.shape)
```

```
(1436, 8)
```

In [11]:

```
correlation=numerical_data.corr()
print(correlation)
```

```
              Price       Age        KM        HP  MetColor
Automatic  \
Price      1.000000 -0.878407 -0.574720  0.309902  0.112041
0.033081
Age       -0.878407  1.000000  0.512735 -0.157904 -0.099659
0.032573
KM        -0.574720  0.512735  1.000000 -0.335285 -0.093825
-0.081248
HP         0.309902 -0.157904 -0.335285  1.000000  0.064749
0.013755
MetColor   0.112041 -0.099659 -0.093825  0.064749  1.000000
-0.013973
Automatic  0.033081  0.032573 -0.081248  0.013755 -0.013973
1.000000
CC         0.165067 -0.120706  0.299993  0.053758  0.029189
-0.069321
Weight     0.581198 -0.464299 -0.026271  0.086737  0.057142
0.057249

                 CC    Weight
Price      0.165067  0.581198
Age       -0.120706 -0.464299
KM         0.299993 -0.026271
HP         0.053758  0.086737
MetColor   0.029189  0.057142
Automatic -0.069321  0.057249
CC         1.000000  0.651450
Weight     0.651450  1.000000
```

data visualization I

In [12]:

```
import sys
import os
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [13]:

```
cars_data1=cars_data.copy(deep=True)
```

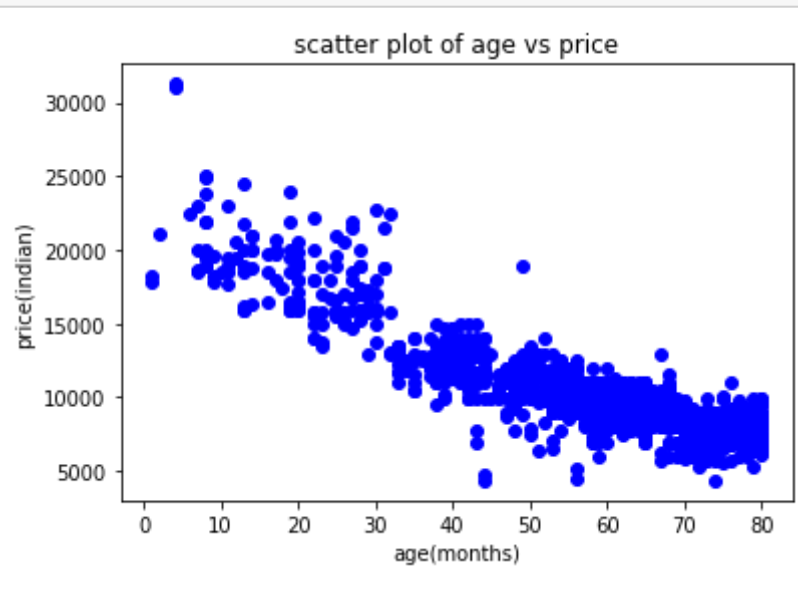
In [14]:

```
cars_data1.dropna(axis=0,inplace=True)
```

using matplot.pyplot as plt for visualization

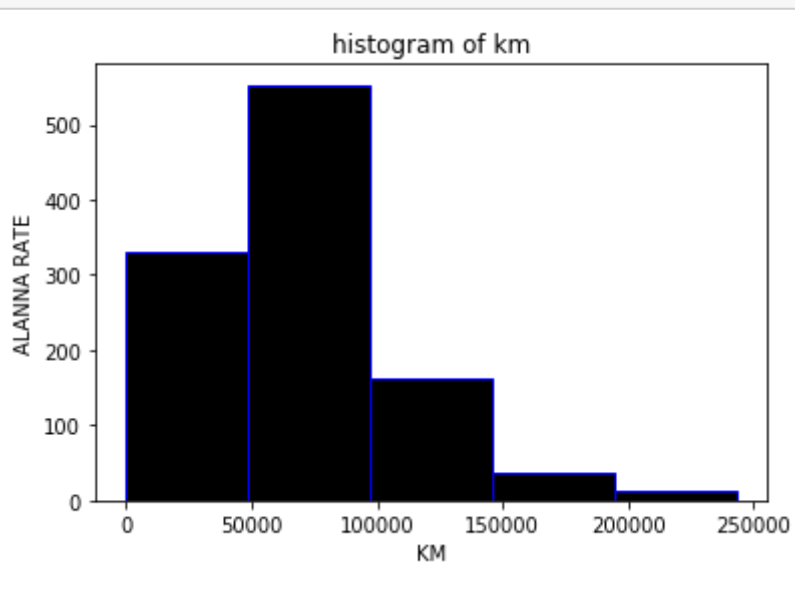
In [15]:

```
#scatterplot
plt.scatter(cars_data1['Age'],cars_data1['Price'],c='blue')
plt.title('scatter plot of age vs price')
plt.xlabel('age(months)')
plt.ylabel('price(indian)')
plt.show()
```



In [16]:

```
#histogram
plt.hist(cars_data1['KM'],
        color='black',
        edgecolor='blue',
        bins = 5)
plt.title('histogram of km')
plt.xlabel('KM')
plt.ylabel('ALANNA RATE')
plt.show()
```



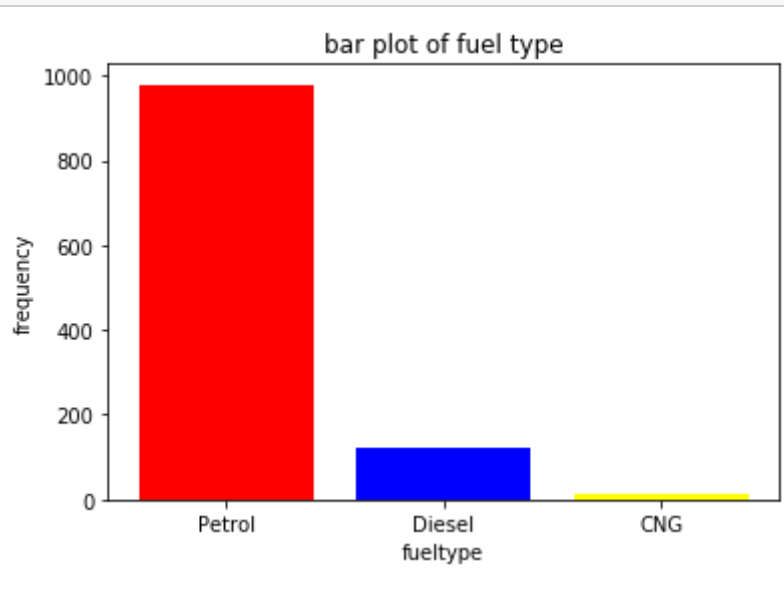
In [17]:

```
#BAR PLOT
counts   =[979,120,12]
fueltype=('Petrol','Diesel','CNG')

index    =np.arange(len(fueltype))

plt.bar(index,counts,color=['red','blue','yellow'])
plt.title('bar plot of fuel type')
plt.xlabel('fueltype')
plt.ylabel('frequency')

#for labelling petrol desel and cng
              #rowloc  label degree of rotation
plt.xticks(index,fueltype,rotation=360)
plt.show()
```



data visualization II

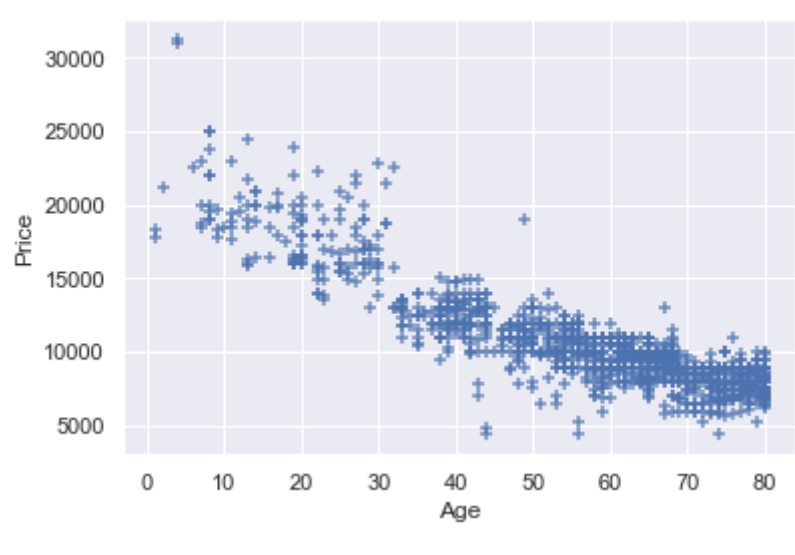
data visualization using seaborn scatter , histogram

In [18]:

```
sns.set(style="darkgrid")
#sns.regplot(x=cars_data1['Age'],y=cars_data1['Price'])
#without regression
sns.regplot(x=cars_data1['Age'],
            y=cars_data1['Price'],
            marker="+",
            fit_reg=False)
```

Out[18]:

<matplotlib.axes._subplots.AxesSubplot at 0xae406f7308>

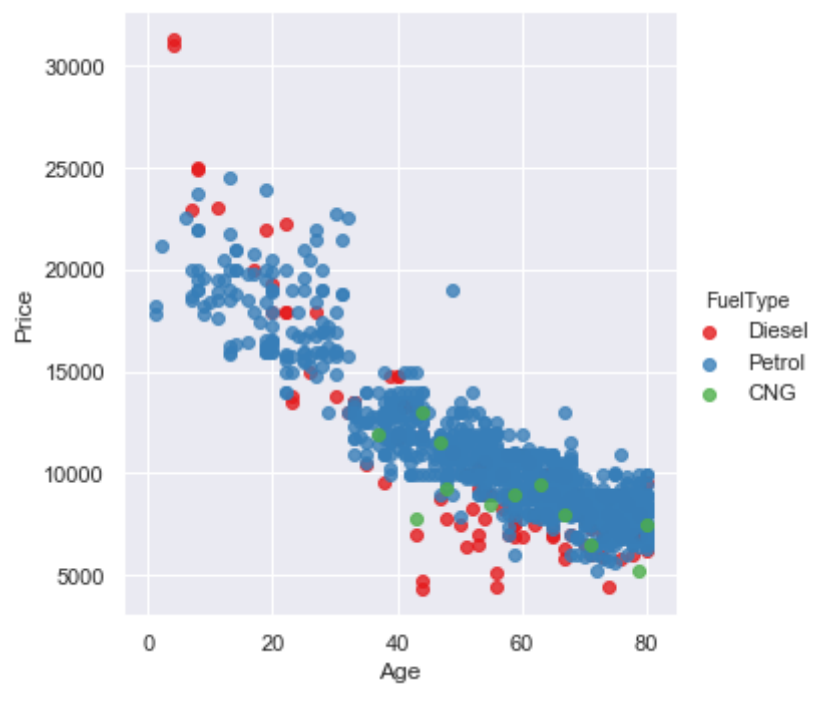


In [19]:

```
#price vs age by fueltype
sns.lmplot(x='Age',y='Price',data=cars_data1,fit_reg=False,
           hue='FuelType',legend=True,palette='Set1')
```

Out[19]:

<seaborn.axisgrid.FacetGrid at 0xae4076a508>



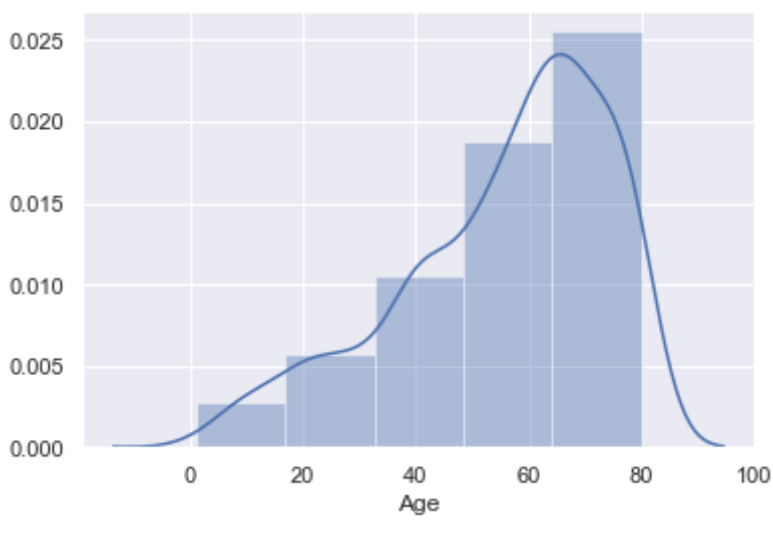
histogram

In [34]:

```
sns.distplot(cars_data1['Age'],kde=False,bins=5)
#                       kernel density estimate
```

Out[34]:

<matplotlib.axes._subplots.AxesSubplot at 0xae46621c48>



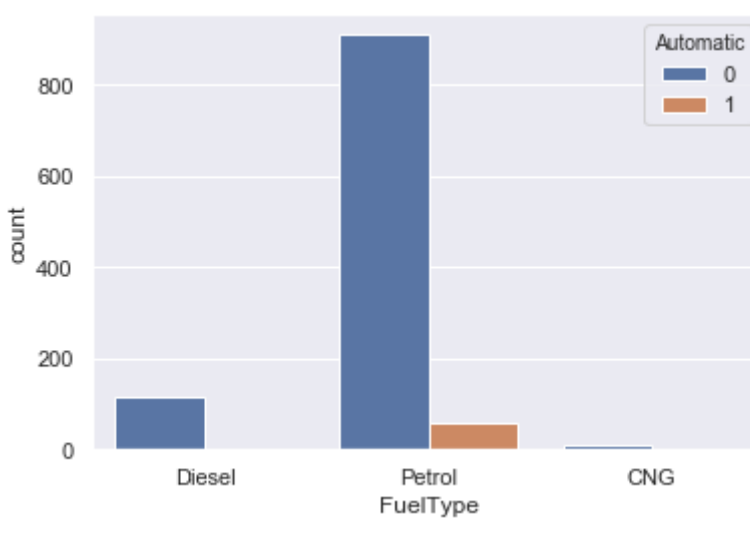
bar plot

In [23]:

```
sns.countplot(x="FuelType",data=cars_data1,hue='Automatic')
```

Out[23]:

<matplotlib.axes._subplots.AxesSubplot at 0xae421a4fc8>



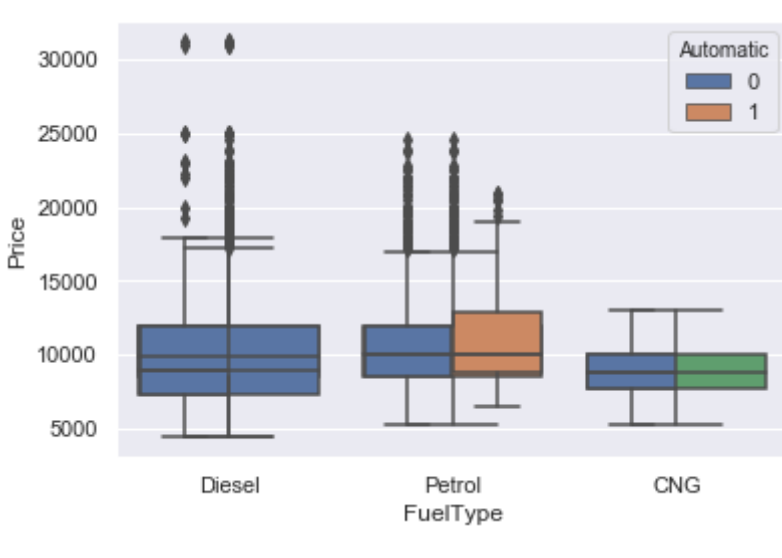
Box and whiskers plot of Price to visually interpret the five-number summary

In [33]:

```
sns.boxplot(y=cars_data1['Price'])
sns.boxplot(x=cars_data1['FuelType'],y=cars_data1['Price'])
sns.boxplot(x=cars_data1['FuelType'],y=cars_data1['Price'],hue='Automatic'
,data=cars_data1)
```

Out[33]:

<matplotlib.axes._subplots.AxesSubplot at 0xae448b2208>

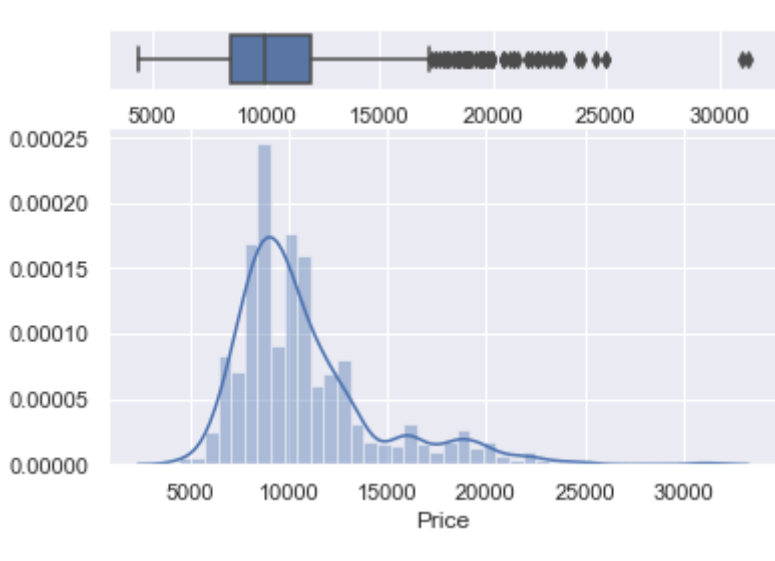


In [41]:

```
f,(ax_box,ax_hist)=plt.subplots(2,gridspec_kw={'height_ratios':(.15,.85)})
sns.boxplot(cars_data1['Price'], ax=ax_box)
sns.distplot(cars_data1['Price'], ax=ax_hist ,kde=False)
```

Out[41]:

<matplotlib.axes._subplots.AxesSubplot at 0xae49aa4688>



pair plot

In [43]:

```
sns.pairplot(cars_data, kind="scatter", hue="FuelType")
plt.show()
```