Data visualization
Part II

GITAA
Transforming careers

In the previous lecture

We learnt how to create basic plots using *matplotlib* library

- Scatter plot
- Histogram
- Bar plot

In this lecture

We will learn how to create basic plots using *seaborn* library:

- Scatter plot
- Histogram
- Bar plot
- Box and whiskers plot
- Pairwise plots

Seaborn

- Seaborn is a Python data visualization library based on matplotlib
- It provides a high-level interface for drawing attractive and informative statistical graphics

Scatter plot

Importing libraries

- Importing necessary libraries

```
import pandas as pd
```
→ ‘pandas’ library to work with dataframes

```
import numpy as np
```
→ ‘numpy’ library to do numerical operations

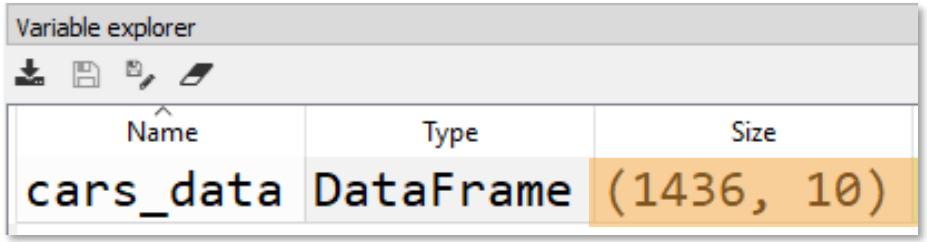
```
import matplotlib.pyplot as plt
```
→ ‘matplotlib’ library to do visualization

```
import seaborn as sns
```
→ ‘seaborn’ library to do visualization

Importing data into Spyder

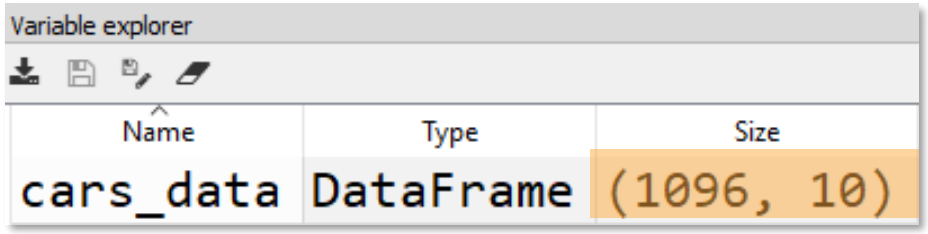
- Importing data

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



- Removing missing values from the dataframe

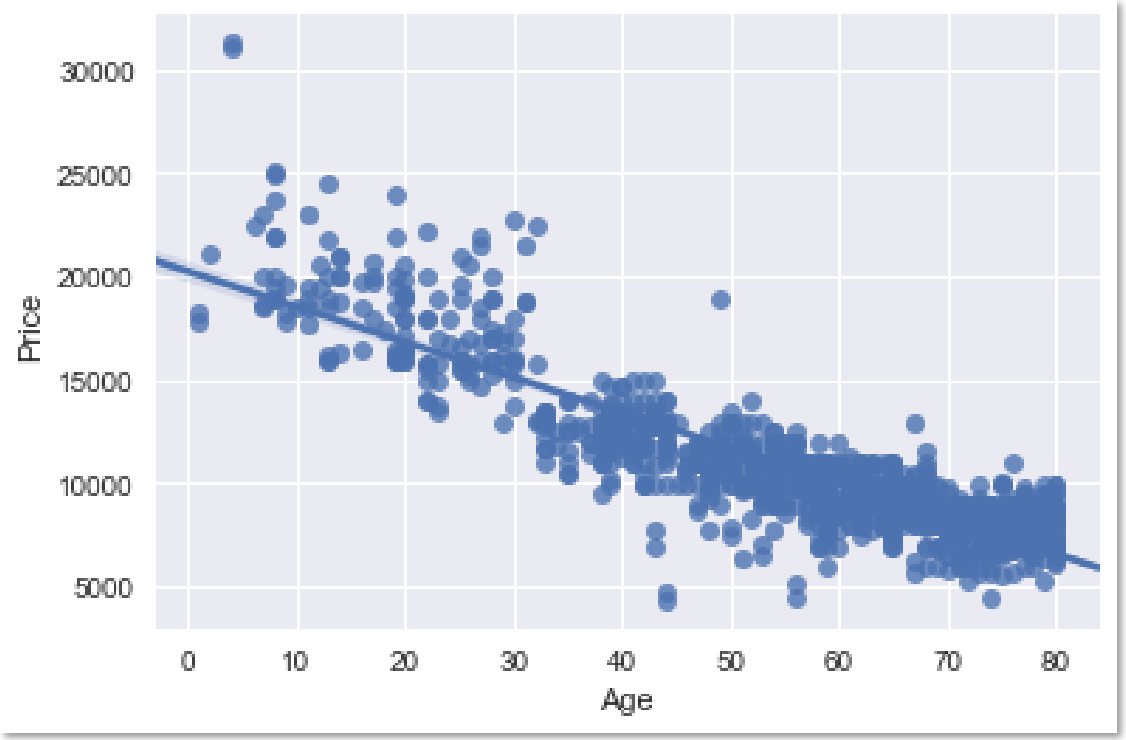
```
cars_data.dropna(axis = 0, inplace=True)
```



Scatter plot

- Scatter plot of *Price vs Age* with default arguments

```
sns.set(style="darkgrid")
sns.regplot(x=cars_data['Age'], y=cars_data['Price'])
```

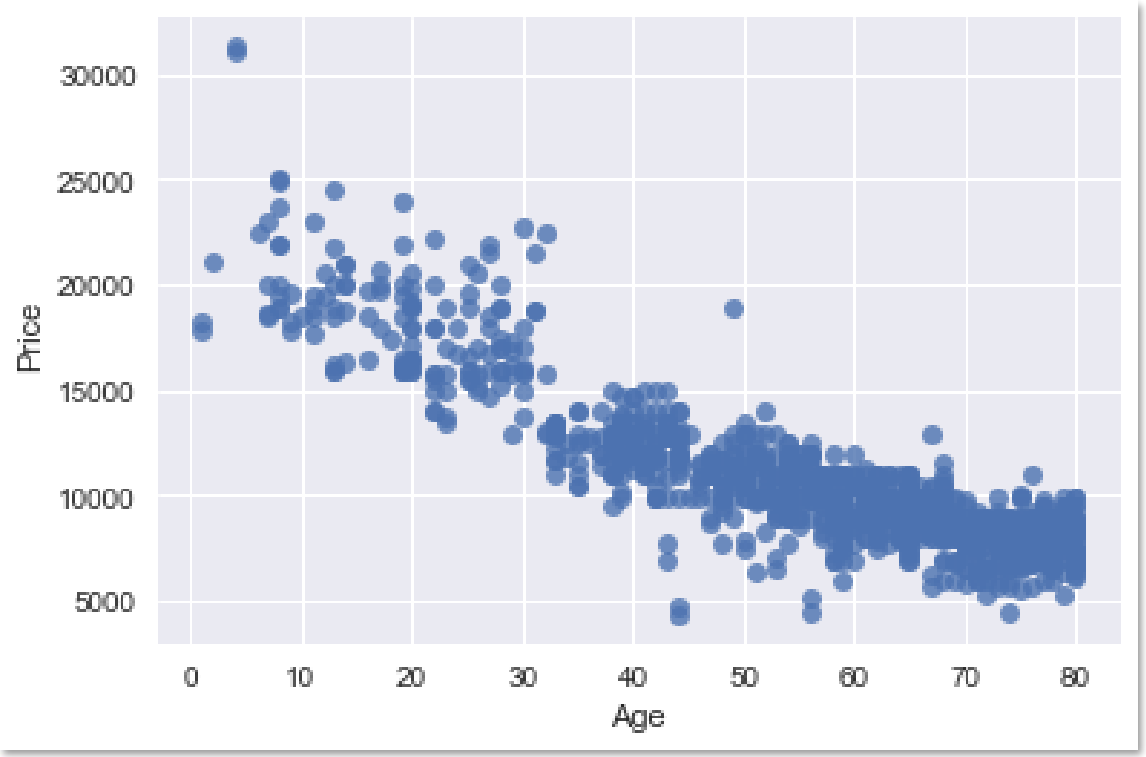


- By default, `fit_reg = True`
- It estimates and plots a regression model relating the x and y variables

Scatter plot

- Scatter plot of *Price vs Age* without the regression fit line

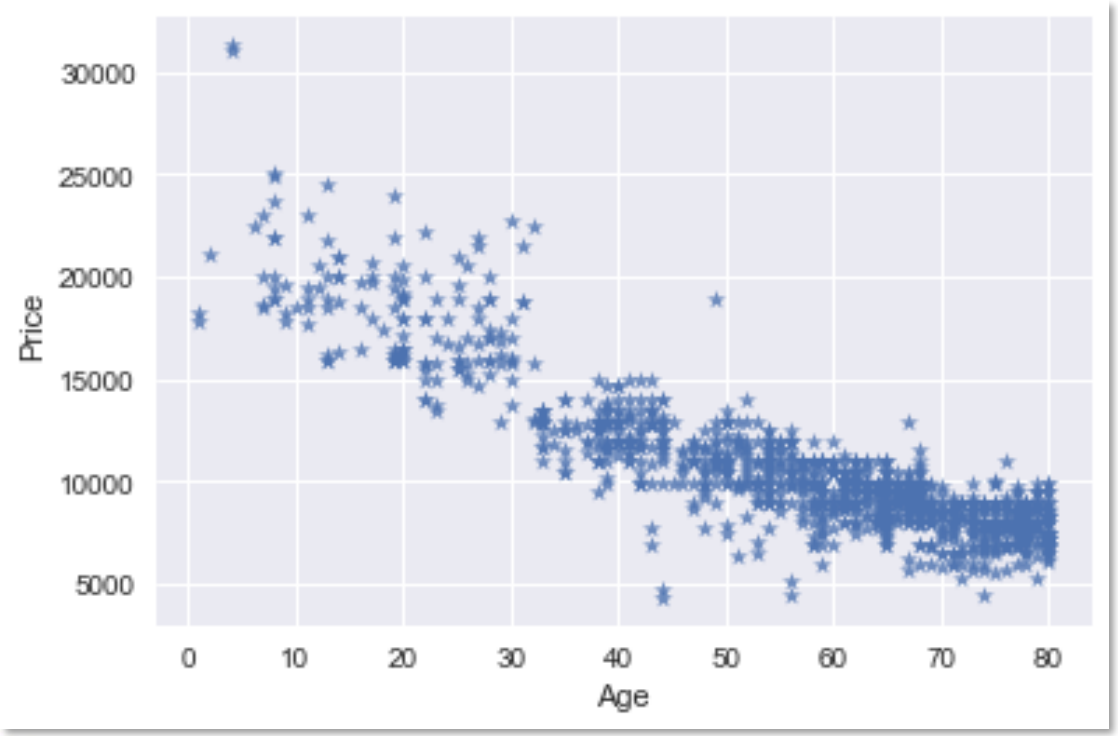
```
sns.regplot(x=cars_data['Age'], y=cars_data['Price'],
            fit_reg=False)
```



Scatter plot

- Scatter plot of *Price vs Age* by customizing the appearance of markers

```
sns.regplot(x=cars_data['Age'], y=cars_data['Price'],
            marker="*", fit_reg=False)
```



Scatter plot

- Scatter plot of *Price vs Age by FuelType*

- Using **hue** parameter, including another variable to show the fuel types categories with different colors

```
sns.lmplot(x='Age', y='Price', data=cars_data,
           fit_reg=False, hue='FuelType',
           legend=True, palette="Set1")
```

Scatter plot

- Scatter plot of *Price vs Age by FuelType*

Similarly, custom the appearance of the markers using

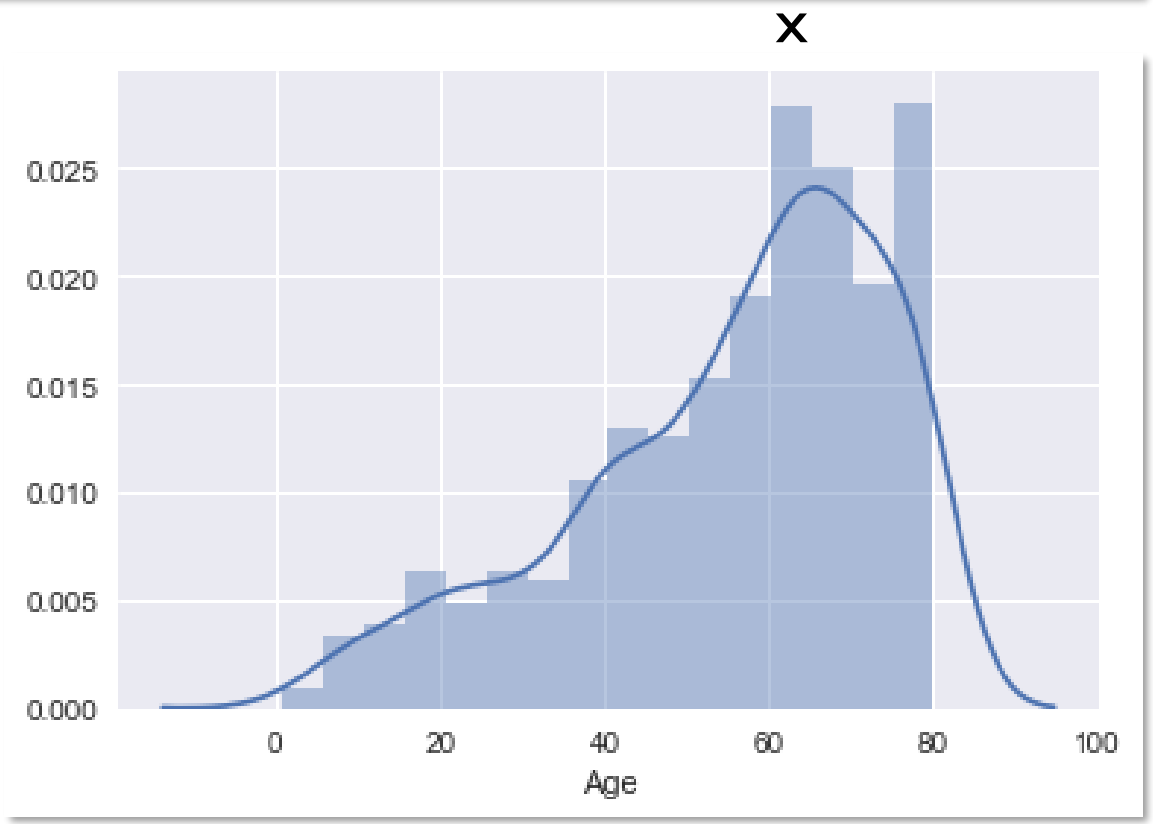
- transparency
- shape
- size

Histogram

Histogram

- Histogram with default kernel density estimate

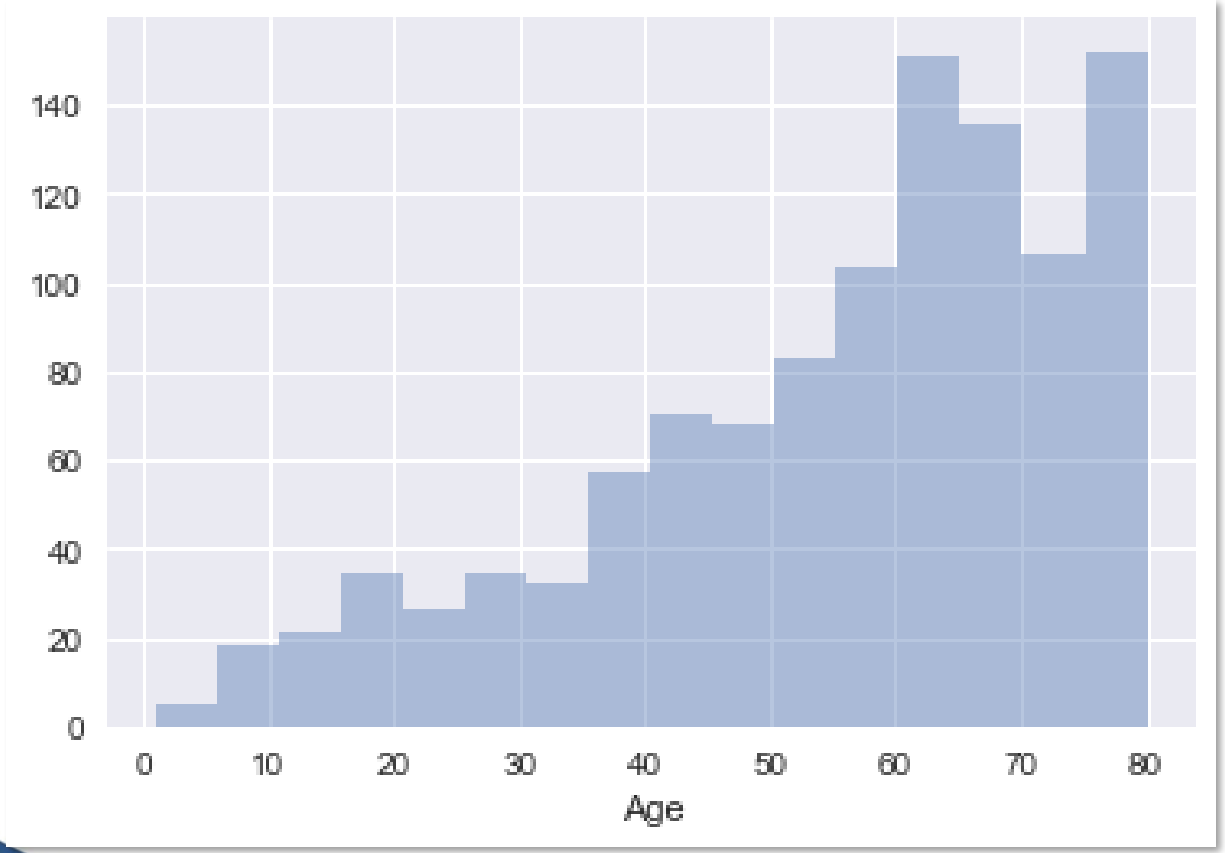
```
sns.distplot(cars_data['Age'] )
```



Histogram

- Histogram without kernel density estimate

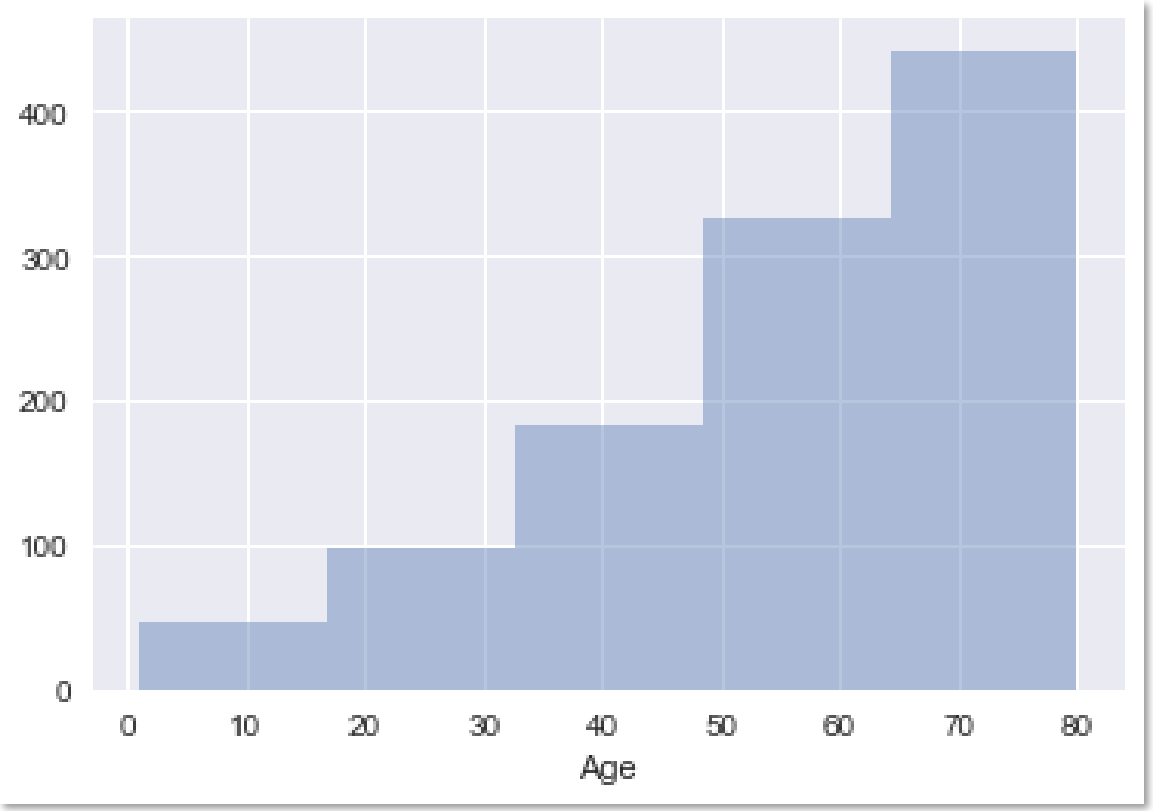
```
sns.distplot(cars_data['Age'],kde=False)
```



Histogram

- Histogram with fixed no. of bins

```
sns.distplot(cars_data['Age'], kde = False, bins=5 )
```

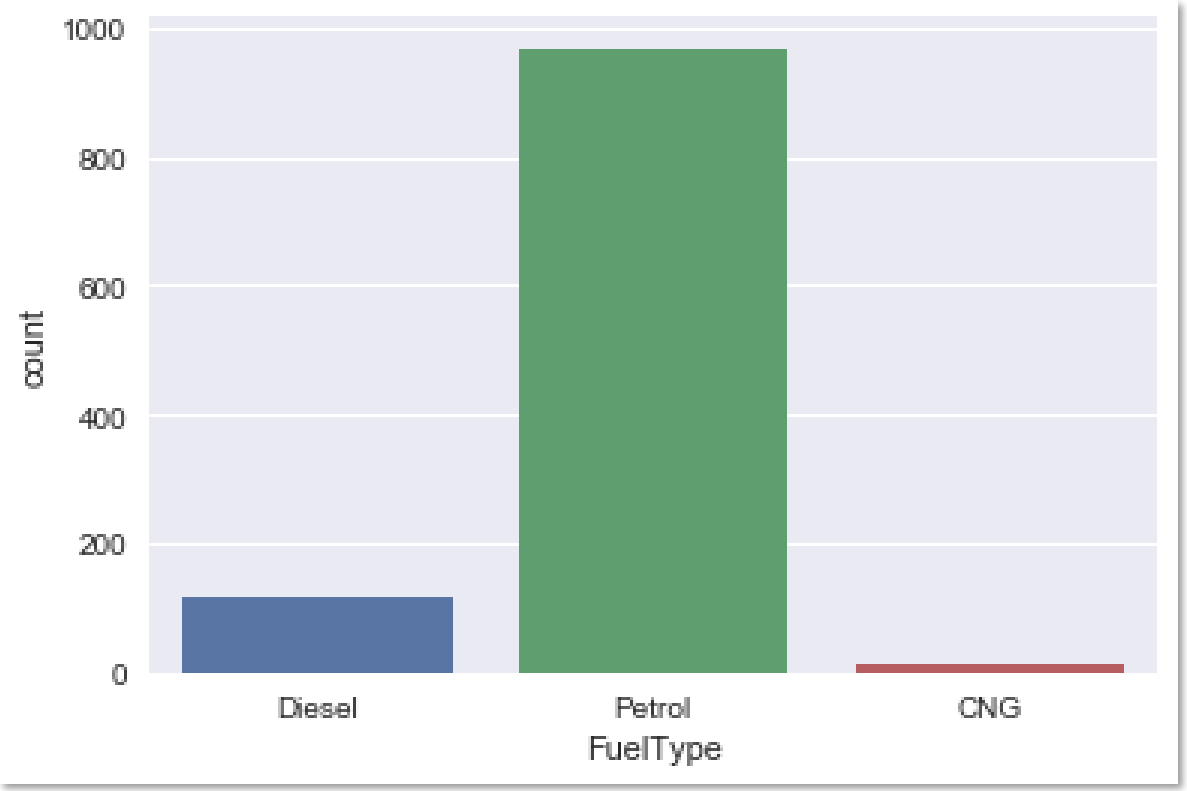


Bar plot

Bar plot

- Frequency distribution of fuel type of the cars

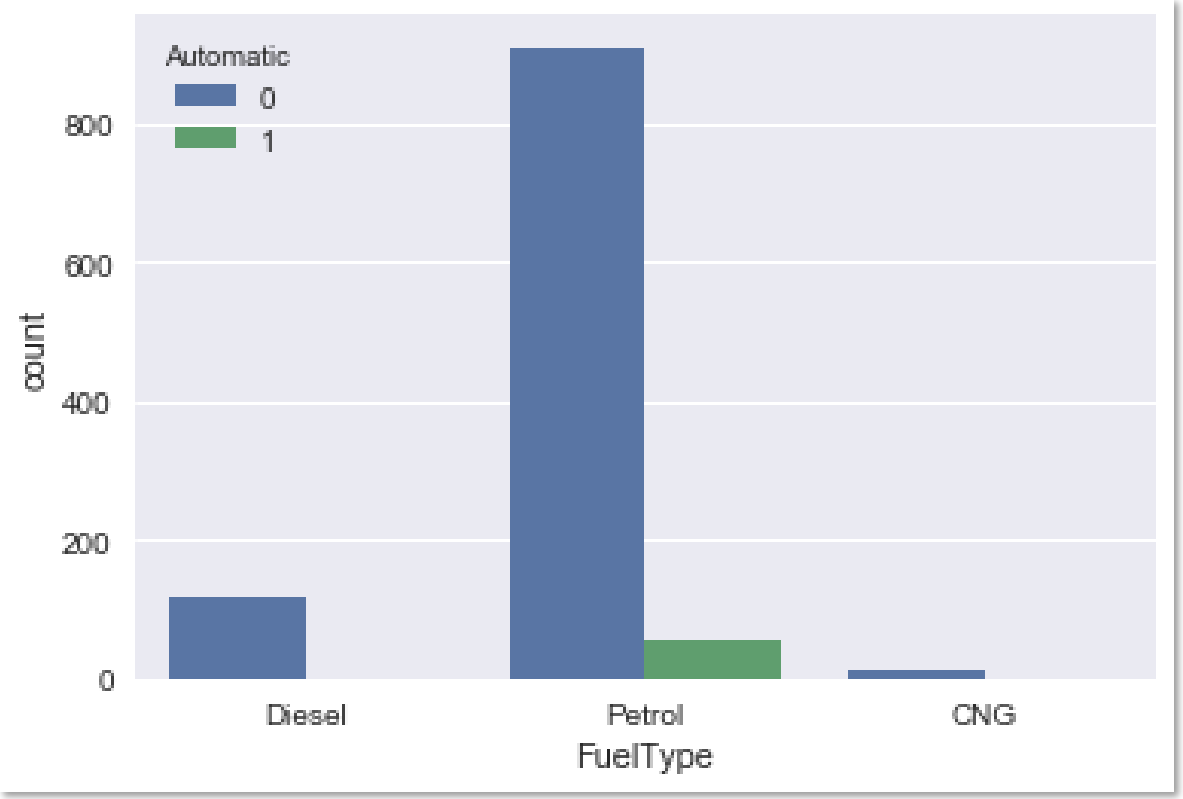
```
sns.countplot(x="FuelType", data=cars_data)
```



Grouped bar plot

- Grouped bar plot of *FuelType* and *Automatic*

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




```
pd.crosstab(index   = cars_data['Automatic'],
            columns = cars_data2['FuelType'],
            dropna  = True)
```

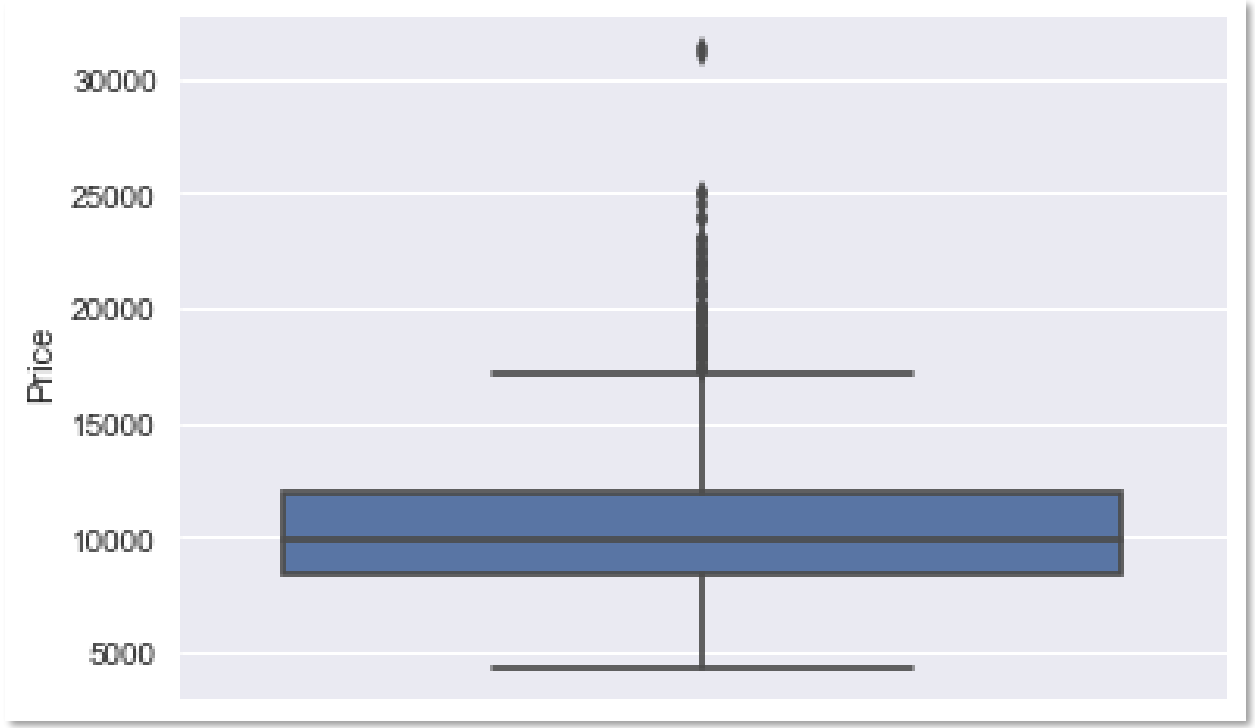
```
Out[5]:
FuelType    CNG  Diesel  Petrol
Automatic
0            15     144    1104
1             0       0      73
```

Box and whiskers plot

Box and whiskers plot – numerical variable

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

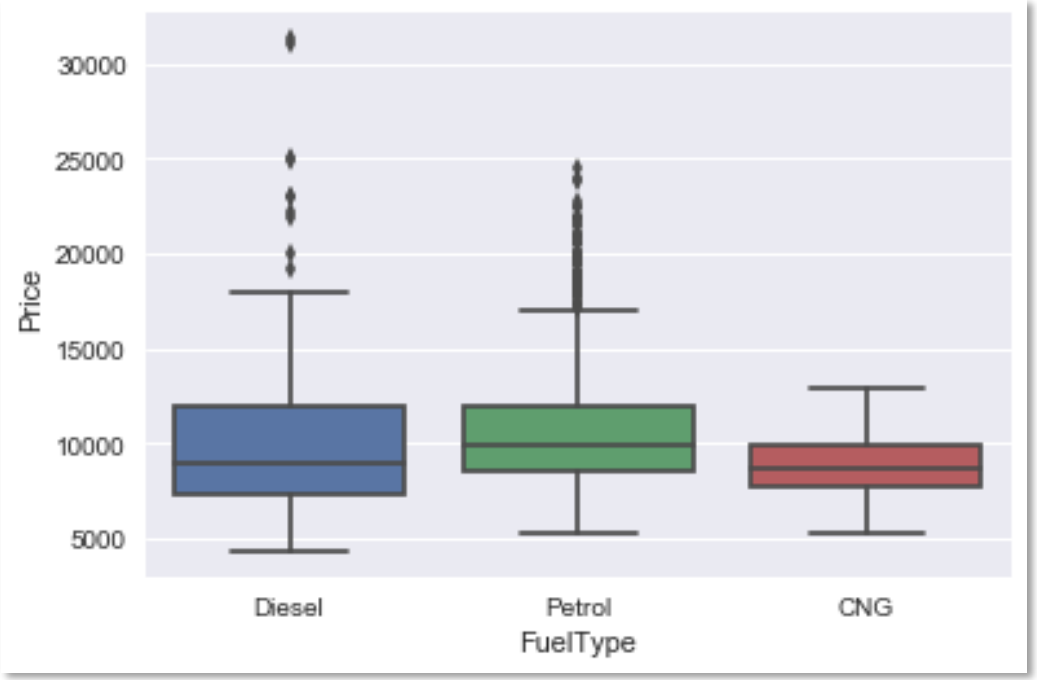
```
sns.boxplot(y=cars_data["Price"] )
```



Box and whiskers plot

- Box and whiskers plot for numerical vs categorical variable
- Price of the cars for various fuel types

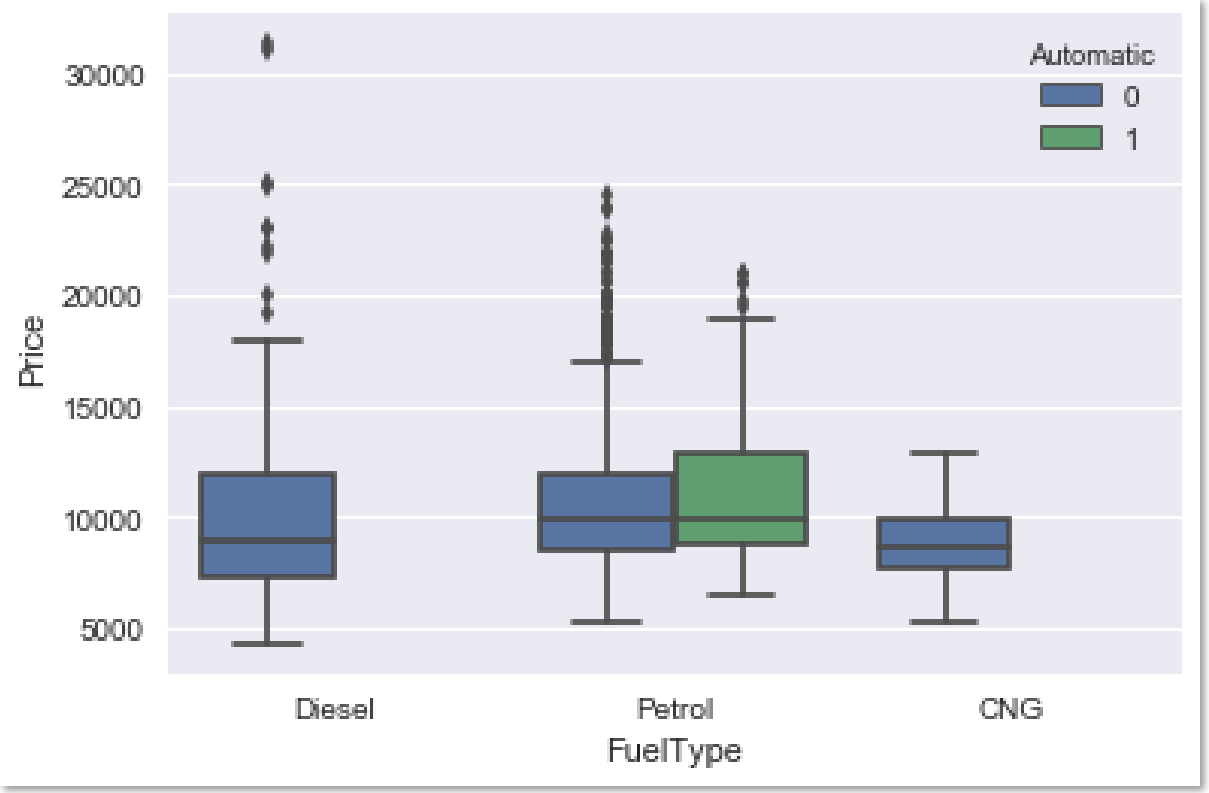
```
sns.boxplot(x = cars_data['FuelType'], y = cars_data["Price"])
```



Grouped box and whiskers plot

- Grouped box and whiskers plot of *Price* vs *FuelType* and *Automatic*

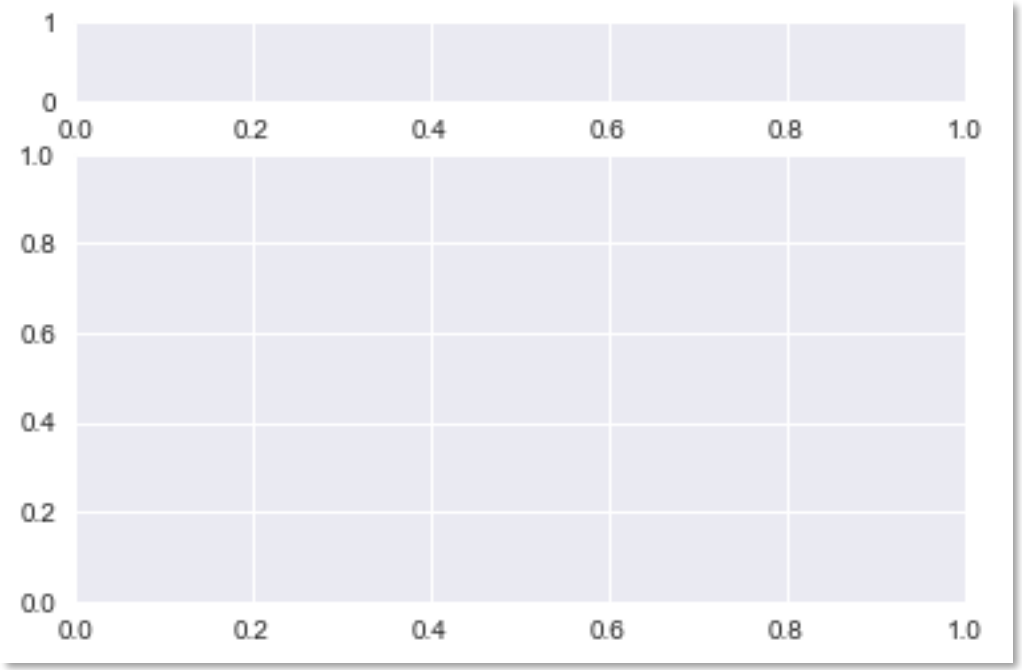
```
sns.boxplot(x = "FuelType",  y = cars_data["Price"],
            hue = "Automatic", data = cars_data)
```



Box-whiskers plot and Histogram

- Let's plot box-whiskers plot and histogram on the same window
- Split the plotting window into 2 parts

```
f,(ax_box, ax_hist)=plt.subplots(2, gridspec_kw={"height_ratios": (.15, .85)})
```

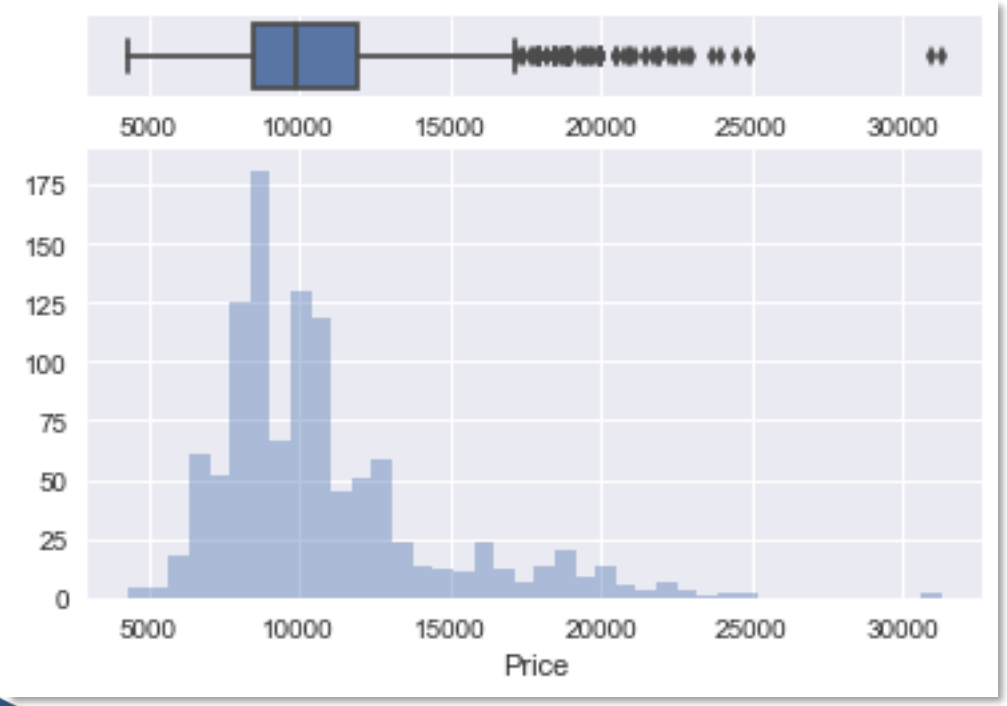


Box-whiskers plot and Histogram

- Now, add create two plots

```
sns.boxplot(cars_data["Price"] , ax=ax_box)

sns.distplot(cars_data["Price"], ax=ax_hist, kde = False)
```



Pairwise plots

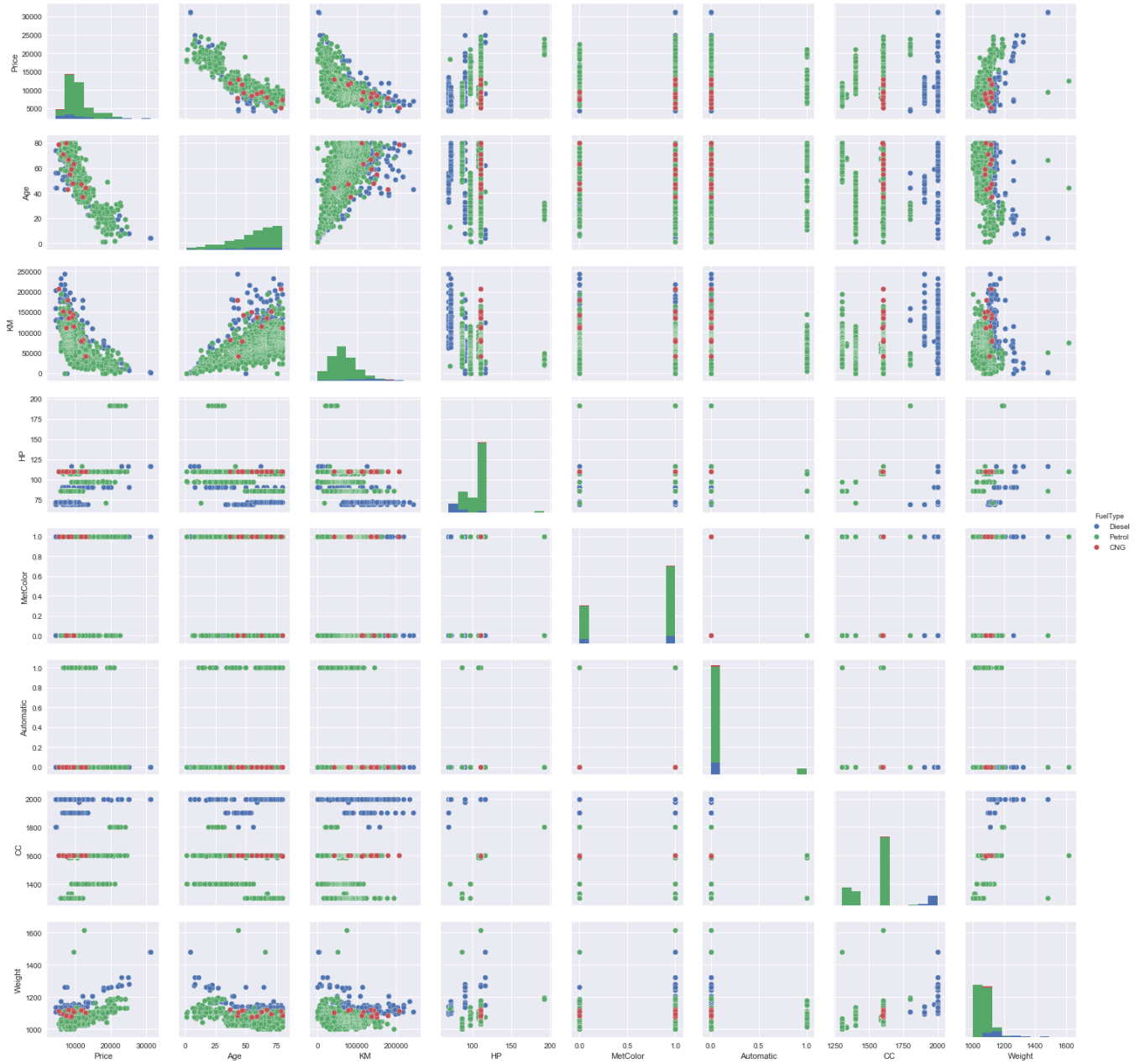
- It is used to plot pairwise relationships in a dataset
- Creates scatterplots for joint relationships and histograms for univariate distributions

Code:

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

Pairwise plots

Output:



Summary

We have learnt how to create basic plots using *seaborn* library:

- Scatter plot
- Histogram
- Bar plot
    - Grouped bar plot
- Box and whiskers plot
    - Grouped box and whiskers plot
- Pairwise plots


operation == "MIRROR_X":
irror_mod.use_x = True
irror_mod.use_y = False
irror_mod.use_z = False
operation == "MIRROR_Y":
irror_mod.use_x = False
irror_mod.use_y = True
irror_mod.use_z = False
operation == "MIRROR_Z":
irror_mod.use_x = False
irror_mod.use_y = False
irror_mod.use_z = True
selection at the end -add
_ob.select= 1
er_ob.select=1
ntext.scene.objects.acti
("Selected" + str(modifier
irror_ob.select = 0
bpy.context.selected_ob
ata.objects[one.name].se
int("please select exact

THANK YOU