EXPLORATORY DATA ANALYSIS

Step 1 : Importing necessary Libraries and the data set and creating dataframe.

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sb
apnadata = pd.read_csv('automobilepricebymileage.csv')
```

Step 2 : Obtaining information on dataset.

```
apnadata.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 19 entries, 0 to 18
Data columns (total 3 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Mileage        19 non-null     int64
 1   Age(yrs)       19 non-null     int64
 2   Sell Price($)  19 non-null     int64
dtypes: int64(3)
memory usage: 584.0 bytes
```

Step 3 : Checking the dimension of the given data set.

```
apnadata.shape
```

```
(19, 3)
```

Step 4 : Checking size of dataset.

```
apnadata.size
```

```
57
```

Step 5 : Understanding the variables in the data set.

```
apnadata.head()
```

```
   Mileage  Age(yrs)  Sell Price($)
0    69000         6          18000
1    35000         3          34000
2    57000         5          26100
3    22500         2          40000
4    46000         4          31500
```

Step 6 : Checking for null values in dataset.

```
apnadata.isnull().sum()
```

```
Mileage          0
Age(yrs)         0
Sell Price($)    0
dtype: int64
```

Step 7 : Dropping duplicate rows and columns if any

```
apnadata.drop_duplicates()
apnadata.shape
```

```
(19, 3)
```

Step 8 : Slicing- Slicing row indexes from 5 to 10 and column indexes from 0 to 1

```
#apnadata.iloc[row slicing, column slicing]
apnadata.iloc[5:11,0:2]
```

```
    Mileage  Age(yrs)
5     59000         5
6     52000         5
7     72000         6
8     91000         8
9     67000         6
10    83000         7
```

Step 9 : Finding number of unique values in dataset

```
apnadata['Age(yrs)'].nunique()
```

```
7
```

Step 10 : Finding count of unique values in dataset

```
apnadata['Age(yrs)'].unique()
```

```
array([6, 3, 5, 2, 4, 8, 7])
```

Step 11 : Using value_counts() method on Mileage and age to identify the count of each category in that column

```
apnadata['Mileage'].value_counts()
```

```
69000    2
59000    2
67000    1
28000    1
25400    1
82450    1
58780    1
79000    1
83000    1
91000    1
35000    1
```

```
72000    1
52000    1
46000    1
22500    1
57000    1
87600    1
Name: Mileage, dtype: int64
```

```
apnadata['Age(yrs)'].value_counts()
```

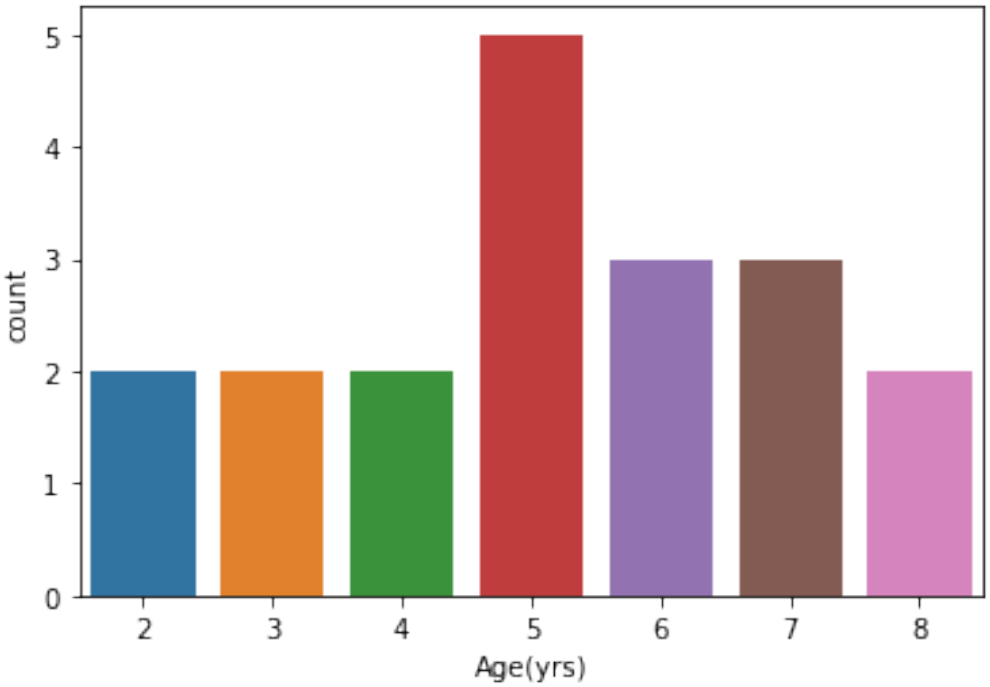
```
5    5
6    3
7    3
3    2
2    2
4    2
8    2
Name: Age(yrs), dtype: int64
```

VISUALIZATIONS

Number of automobiles for each corresponding age

```
sb.countplot(x='Age(yrs)',data=apnadata)
```

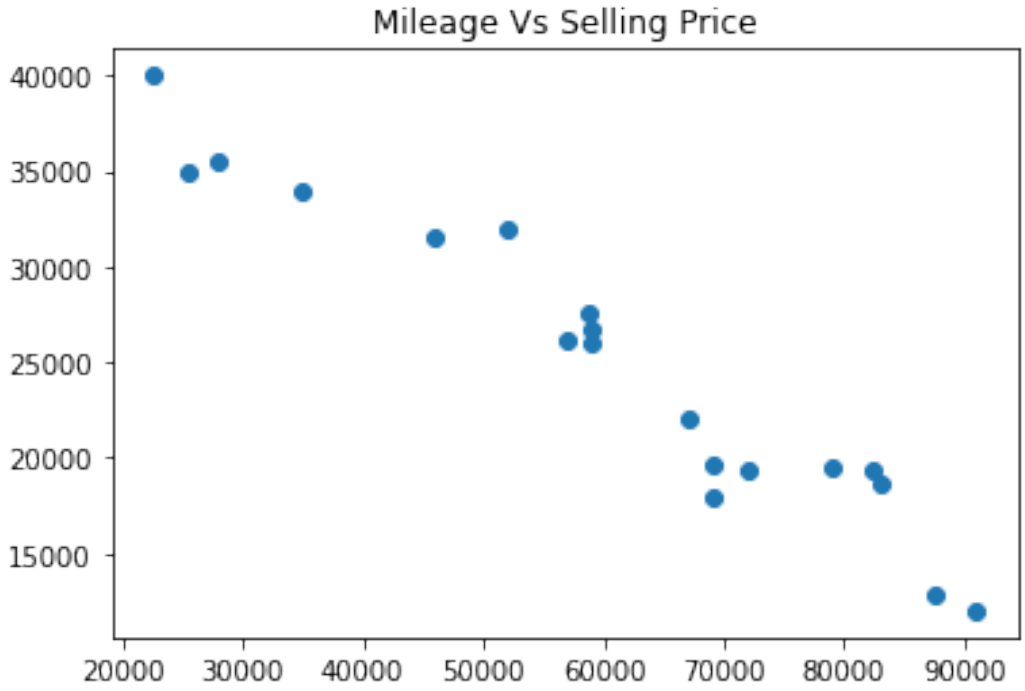
```
<matplotlib.axes._subplots.AxesSubplot at 0x7fe16486e610>
```



Mileage of automobile Vs its Selling price

```
plt.scatter(apnadata['Mileage'],apnadata['Sell Price($)'])
plt.title("Mileage Vs Selling Price")
```

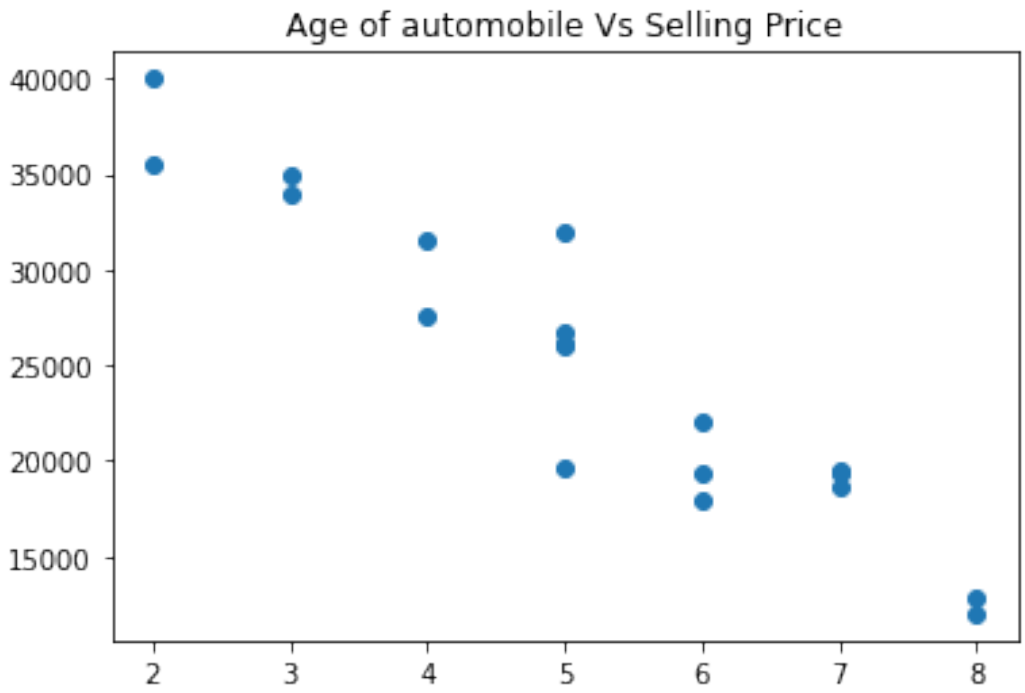
```
Text(0.5, 1.0, 'Mileage Vs Selling Price')
```



Age of automobile Vs Selling Price

```
plt.scatter(apnadata['Age(yrs)'],apnadata['Sell Price($)'])
plt.title("Age of automobile Vs Selling Price")
```

```
Text(0.5, 1.0, 'Age of automobile Vs Selling Price')
```



Looking at above two scatter plots, using linear regression model makes sense as we can clearly see a linear relationship between our dependant (i.e. Selling Price) and independant variables (i.e. age and mileage)

The approach we are going to use here is to split available data in two sets

1.Training: We will train our model on this dataset

2.Testing: We will use this subset to make actual predictions using trained model

APPLYING REGRESSION

Step 1 : Splitting the data set into input and output.

```
x = apnadata[['Mileage','Age(yrs)']]
y = apnadata['Sell Price($)']
```

Step 2 : Splitting the data set into training and testing data set.

```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x,y,test_size=0.3)
```

```
x_train
```

```
    Mileage  Age(yrs)
8     91000         8
17    69000         5
18    87600         8
10    83000         7
```

```
4     46000         4
7     72000         6
5     59000         5
6     52000         5
11    79000         7
16    28000         2
9     67000         6
15    25400         3
14    82450         7
```

```
x_test
```

```
    Mileage  Age(yrs)
1     35000         3
13    58780         4
0     69000         6
3     22500         2
2     57000         5
12    59000         5
```

```
y_train
```

```
8     12000
17    19700
18    12800
10    18700
4     31500
7     19300
5     26750
6     32000
11    19500
16    35500
9     22000
15    35000
14    19400
Name: Sell Price($), dtype: int64
```

```
y_test
```

```
1     34000
13    27500
0     18000
3     40000
2     26100
12    26000
Name: Sell Price($), dtype: int64
```

Step 3 : Applying a regressor model on training set.

```
from sklearn.linear_model import LinearRegression
model = LinearRegression()
```

Step 4 : To Fit the model(Mapping/Plotting of Inputs with the Outputs)

```
model.fit(x_train, y_train)
```

```
LinearRegression()
```

Step 5 : Predicting the output.

```
model.predict(x_test)
```

```
array([33900.28281421, 25013.44107011, 21890.08696084, 38361.42248562,
       26155.05189498, 25370.35294593])
```

Step 6 : Calculating the accuracy of the model

```
model.score(x_test,y_test)
```

```
0.9145603157635419
```

Therefore, the accuracy of our model is 91%.