Assignment - 04 - Simple Linear Regression - 2

In [1]:

```
# import libraries
import pandas as pd
import numpy as np
import seaborn as sns
import statsmodels.formula.api as smf
```

In [2]:

```
# import dataset
dataset=pd.read_csv('Downloads\\Salary_Data.csv')
dataset
```

Out[2]:

	YearsExperience	Salary
0	1.1	39343.0
1	1.3	46205.0
2	1.5	37731.0
3	2.0	43525.0
4	2.2	39891.0
5	2.9	56642.0
6	3.0	60150.0
7	3.2	54445.0
8	3.2	64445.0
9	3.7	57189.0
10	3.9	63218.0
11	4.0	55794.0
12	4.0	56957.0
13	4.1	57081.0
14	4.5	61111.0
15	4.9	67938.0
16	5.1	66029.0
17	5.3	83088.0
18	5.9	81363.0
19	6.0	93940.0
20	6.8	91738.0
21	7.1	98273.0
22	7.9	101302.0
23	8.2	113812.0
24	8.7	109431.0
25	9.0	105582.0
26	9.5	116969.0
27	9.6	112635.0
28	10.3	122391.0
29	10.5	121872.0

EDA and Data Visualization

In [3]:

```
dataset.info()
```

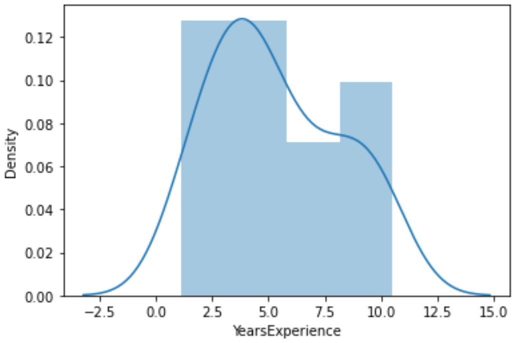
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 30 entries, 0 to 29
Data columns (total 2 columns):
 #   Column           Non-Null Count  Dtype  
---  ------           --------------  -----  
 0   YearsExperience  30 non-null     float64
 1   Salary           30 non-null     float64
dtypes: float64(2)
memory usage: 608.0 bytes
```

In [7]:

```
import warnings
warnings.filterwarnings('ignore')
sns.distplot(dataset["YearsExperience"])
```

Out[7]:

```
<AxesSubplot:xlabel='YearsExperience', ylabel='Density'>
```

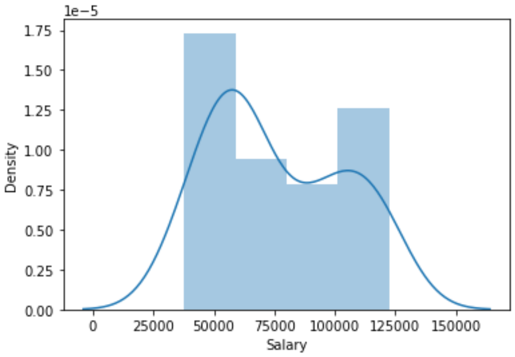


In [8]:

```
sns.distplot(dataset["Salary"])
```

Out[8]:

```
<AxesSubplot:xlabel='Salary', ylabel='Density'>
```



Correlation Analysis

In [10]:

```
dataset.corr()
```

Out[10]:

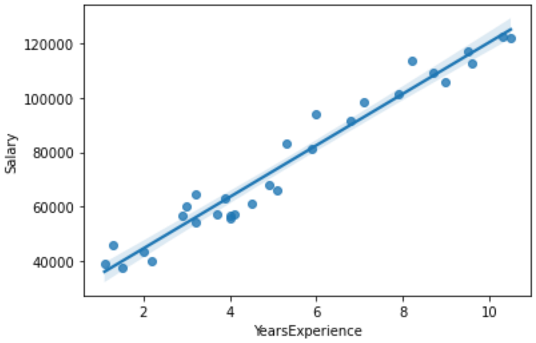
	YearsExperience	Salary
YearsExperience	1.000000	0.978242
Salary	0.978242	1.000000

In [11]:

```
sns.regplot(x=dataset['YearsExperience'],y=dataset['Salary'])
```

Out[11]:

```
<AxesSubplot:xlabel='YearsExperience', ylabel='Salary'>
```



Model Building

In [12]:

```
model=smf.ols("Salary~YearsExperience",data=dataset).fit()
```

Model Testing

In [13]:

```
# Finding Coefficient Parameters
model.params
```

Out[13]:

```
Intercept          25792.200199
YearsExperience     9449.962321
dtype: float64
```

In [15]:

```
# Finding Pvalues and tvalues
model.pvalues , model.tvalues
```

Out[15]:

```
(Intercept          5.511950e-12
 YearsExperience    1.143068e-20
 dtype: float64,
 Intercept          11.346940
 YearsExperience    24.950094
 dtype: float64)
```

In [16]:

```
# Finding Rsquared values
model.rsquared , model.rsquared_adj
```

Out[16]:

```
(0.9569566641435086, 0.9554194021486339)
```

Model Prediction

In [19]:

```
# Manual prediction for say 3 years
Salary = 5792.200199 + 9449.962321
Salary
```

Out[19]:

```
15242.162520000002
```

In [20]:

```
# Automatic prediction for say 3 and 5 years
```

In [21]:

```
new_data=pd.Series([3,5])
new_data
```

Out[21]:

```
0    3
1    5
dtype: int64
```

In [26]:

```
data_pred=pd.DataFrame(new_data,columns=["YearsExperience"])
data_pred
```

Out[26]:

	YearsExperience
0	3
1	5

In [27]:

```
model.predict(data_pred)
```

Out[27]:

```
0    54142.087163
1    73042.011806
dtype: float64
```

In [ ]:

```

```