```
# IMPORTANT: RUN THIS CELL IN ORDER TO IMPORT YOUR KAGGLE DATA SOURCES
# TO THE CORRECT LOCATION (/kaggle/input) IN YOUR NOTEBOOK,
# THEN FEEL FREE TO DELETE THIS CELL.
# NOTE: THIS NOTEBOOK ENVIRONMENT DIFFERS FROM KAGGLE'S PYTHON
# ENVIRONMENT SO THERE MAY BE MISSING LIBRARIES USED BY YOUR
# NOTEBOOK.

import os
import sys
from tempfile import NamedTemporaryFile
from urllib.request import urlopen
from urllib.parse import unquote, urlparse
from urllib.error import HTTPError
from zipfile import ZipFile
import tarfile
import shutil

CHUNK_SIZE = 40960
DATA_SOURCE_MAPPING = 'salary-data-prediction:https%3A%2F%2Fstorage.googleapis.com%2Fkaggle-data-sets%2F1228819%2F2051101%2Fbundle%2Farch

KAGGLE_INPUT_PATH='/kaggle/input'
KAGGLE_WORKING_PATH='/kaggle/working'
KAGGLE_SYMLINK='kaggle'

!umount /kaggle/input/ 2> /dev/null
shutil.rmtree('/kaggle/input', ignore_errors=True)
os.makedirs(KAGGLE_INPUT_PATH, 0o777, exist_ok=True)
os.makedirs(KAGGLE_WORKING_PATH, 0o777, exist_ok=True)

try:
  os.symlink(KAGGLE_INPUT_PATH, os.path.join("..", 'input'), target_is_directory=True)
except FileExistsError:
  pass
try:
  os.symlink(KAGGLE_WORKING_PATH, os.path.join("..", 'working'), target_is_directory=True)
except FileExistsError:
  pass

for data_source_mapping in DATA_SOURCE_MAPPING.split(','):
    directory, download_url_encoded = data_source_mapping.split(':')
    download_url = unquote(download_url_encoded)
    filename = urlparse(download_url).path
    destination_path = os.path.join(KAGGLE_INPUT_PATH, directory)
    try:
        with urlopen(download_url) as fileres, NamedTemporaryFile() as tfile:
            total_length = fileres.headers['content-length']
            print(f'Downloading {directory}, {total_length} bytes compressed')
            dl = 0
            data = fileres.read(CHUNK_SIZE)
            while len(data) > 0:
                dl += len(data)
                tfile.write(data)
                done = int(50 * dl / int(total_length))
                sys.stdout.write(f"\r[{'=' * done}{' ' * (50-done)}] {dl} bytes downloaded")
                sys.stdout.flush()
                data = fileres.read(CHUNK_SIZE)
            if filename.endswith('.zip'):
              with ZipFile(tfile) as zfile:
                zfile.extractall(destination_path)
            else:
              with tarfile.open(tfile.name) as tarfile:
                tarfile.extractall(destination_path)
            print(f'\nDownloaded and uncompressed: {directory}')
    except HTTPError as e:
        print(f'Failed to load (likely expired) {download_url} to path {destination_path}')
        continue
    except OSError as e:
        print(f'Failed to load {download_url} to path {destination_path}')
        continue

print('Data source import complete.')



#Importing libraries
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np
```

```
#Reading dataset
df=pd.read_csv('../input/salary-data-prediction/Salary_Data.csv')
```

Viewing the dataset

```
df
```

	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

```
df.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
```

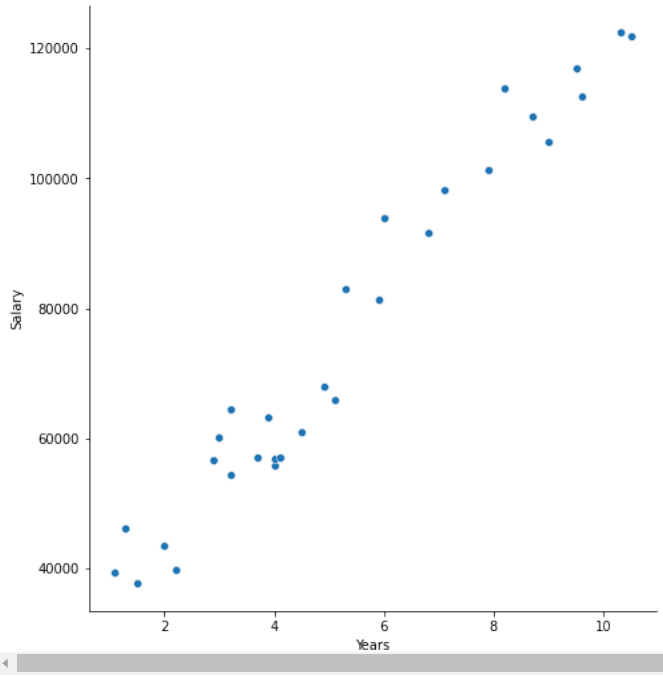
```
df.describe()
```

	YearsExperience	Salary
count	30.000000	30.000000
mean	5.313333	76003.000000
std	2.837888	27414.429785
min	1.100000	37731.000000
25%	3.200000	56720.750000
50%	4.700000	65237.000000
75%	7.700000	100544.750000
max	10.500000	122391.000000

Visualization

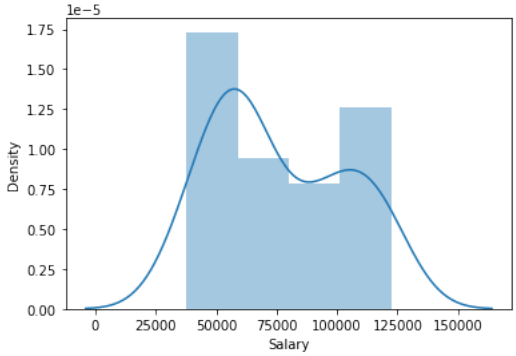
```
#Showing how the variables are scattered
plt.figure(figsize=(12,6))
sns.pairplot(df,x_vars=['YearsExperience'],y_vars=['Salary'],size=7,kind='scatter')
plt.xlabel('Years')
plt.ylabel('Salary')
```

```
/opt/conda/lib/python3.7/site-packages/seaborn/axisgrid.py:2076: UserWarning: The `size` parameter has been renamed to `height`; ple
  warnings.warn(msg, UserWarning)
Text(-1.8350000000000009, 0.5, 'Salary')
<Figure size 864x432 with 0 Axes>
```



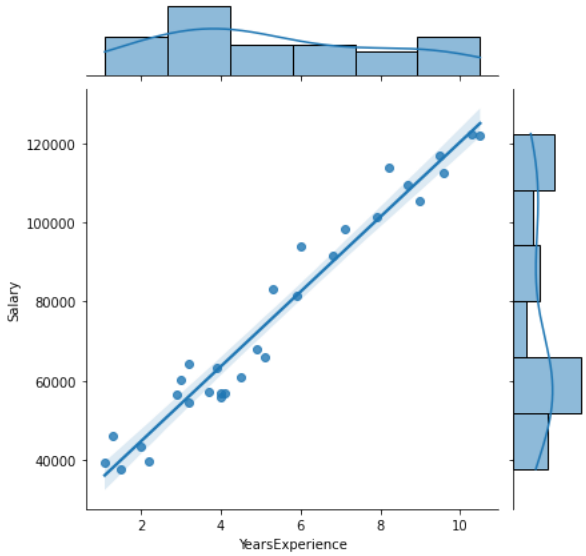

```
sns.distplot(df["Salary"])
```

```
/opt/conda/lib/python3.7/site-packages/seaborn/distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be
  warnings.warn(msg, FutureWarning)
<AxesSubplot:xlabel='Salary', ylabel='Density'>
```




```
#Showing a regression line
sns.jointplot(x="YearsExperience", y="Salary", kind="reg", data=df)
```

```
<seaborn.axisgrid.JointGrid at 0x7a86702ba910>
```




```
#Checking for null values
df.isnull().sum()
```

```
YearsExperience    0
Salary             0
dtype: int64
```

Defining X data & Y data

```
X=df['YearsExperience']
Y=df['Salary']
```

Simple Linear Regression

```
#Importing segregating data from scikit learn
from sklearn.model_selection import train_test_split
```

```
#Splitting the data for train and test
X_train,X_test,y_train,y_test = train_test_split(X,Y, train_size=0.7,random_state=100)
```

```
#Create new axis for x column
X_train = X_train[:,np.newaxis]
X_test = X_test[:,np.newaxis]
```

```
/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:2: FutureWarning: Support for multi-dimensional indexing (e.g. `obj[:,

/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:3: FutureWarning: Support for multi-dimensional indexing (e.g. `obj[:,
  This is separate from the ipykernel package so we can avoid doing imports until
```

```
#Importing the model
from sklearn.linear_model import LinearRegression
```

```
#Fitting data to the model
lr = LinearRegression()
lr.fit(X_train,y_train)
```

```
LinearRegression()
```

```
#Predicting the Salary for the test values
y_predict = lr.predict(X_test)
y_predict
```

```
array([ 61208.34198766, 117649.32424949, 125434.28732008,  65100.82352296,
        53423.37891707,  64127.70313914, 118622.44463331, 112783.72233036,
        54396.49930089])
```

Let,s check this with an example. Assume that an employee has 3.4 years of experience and we want to predict salary.

```
lr.predict([[3.4]])
```

```
array([58288.98083619])
```

The predicted salary for an employee with 3.4 years is approximately 58289.

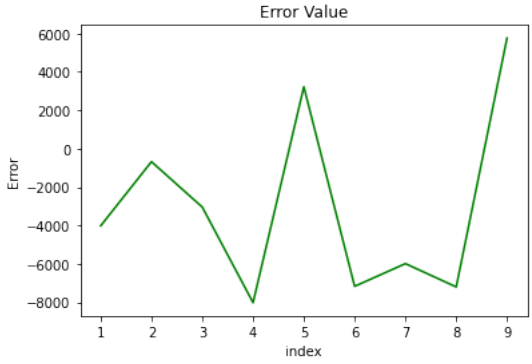
Analyzing the prediction

```
#Plotting the actual and predicted values
c = [i for i in range (1,len(y_test)+1,1)]
plt.plot(c,y_test,color='r',linestyle='-')
plt.plot(c,y_predict,color='b',linestyle='-')
plt.xlabel('Salary')
plt.ylabel('index')
plt.title('Actual vs. Predicted')
```

```
Text(0.5, 1.0, 'Actual vs. Predicted')
```


```
#Plotting the error
c = [i for i in range(1,len(y_test)+1,1)]
plt.plot(c,y_test-y_predict,color='green',linestyle='-')
plt.xlabel('index')
plt.ylabel('Error')
plt.title('Error Value')
```

```
Text(0.5, 1.0, 'Error Value')
```




```
#Intercept and coeff of the line
print('Intercept of the model:',lr.intercept_)
print('Coefficient of the line:',lr.coef_)
```

```
Intercept of the model: 25202.887786154883
Coefficient of the line: [9731.20383825]
```

Then it is said to form a line with

y = 25202.8 + 9731.2x