ICP3

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Github Link:

https://github.com/venkat137222/week-3---ICP3

Video Link:

https://drive.google.com/file/d/1aGeFRxSvS1IE2WHzoMkMU8NDYrzwE8Jv/view?usp=drive_link

1. Data Manipulation

a. Read the provided CSV file 'data.csv'.

b. https://drive.google.com/drive/folders/1h8C3mLsso-R-sIOLsvoYwPLzy2fJ4IOF?usp=sharing

c. Show the basic statistical description about the data.

d. Check if the data has null values.

- Replace the null values with the mean

e. Select at least two columns and aggregate the data using: min, max, count, mean.

f. Filter the dataframe to select the rows with calories values between 500 and 1000.

g. Filter the dataframe to select the rows with calories values > 500 and pulse < 100.

h. Create a new "df_modified" dataframe that contains all the columns from df except for "Maxpulse".

i. Delete the "Maxpulse" column from the main df dataframe

j. Convert the datatype of Calories column to int datatype

k. Using pandas create a scatter plot for the two columns (Duration and Calories).

```python
import numpy as np
import pandas as pd
# 1 Import the given "Data.csv"
dst_Data = pd.read_csv('/content/data.csv')
dst_Data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 169 entries, 0 to 168
Data columns (total 4 columns):
 #   Column    Non-Null Count  Dtype
---  ------    --------------  -----
 0   Duration  169 non-null    int64
 1   Pulse     169 non-null    int64
 2   Maxpulse  169 non-null    int64
 3   Calories  164 non-null    float64
dtypes: float64(1), int64(3)
memory usage: 5.4 KB
```

```python
# Show the basic statistical description about the data.
dst_Data.head()
```

	Duration	Pulse	Maxpulse	Calories
0	60	110	130	409.1
1	60	117	145	479.0
2	60	103	135	340.0
3	45	109	175	282.4
4	45	117	148	406.0

Next steps: Generate code with dst_Data View recommended plots

```python
# Check if the data has null values.
dst_Data.isnull().any()
```

	0
Duration	False
Pulse	False
Maxpulse	False
Calories	True

dtype: bool

```
dst_Data.fillna(dst_Data.mean(), inplace=True)
dst_Data.isnull().any()
```

```
                0
Duration    False
Pulse       False
Maxpulse    False
Calories    False

dtype: bool
```

```
[16] # Replace the null values with the mean
column_means = dst_Data.mean()
print(column_means)
dst_Data = dst_Data. fillna(column_means)
print(dst_Data.head(20))
```

```
Duration      63.846154
Pulse        107.461538
Maxpulse     134.047337
Calories     375.790244
dtype: float64
    Duration  Pulse  Maxpulse     Calories
0         60    110       130   409.100000
1         60    117       145   479.000000
2         60    103       135   340.000000
3         45    109       175   282.400000
4         45    117       148   406.000000
5         60    102       127   300.000000
```

```
6         60    110       136   374.000000
7         45    104       134   253.300000
8         30    109       133   195.100000
9         60     98       124   269.000000
10        60    103       147   329.300000
11        60    100       120   250.700000
12        60    106       128   345.300000
13        60    104       132   379.300000
14        60     98       123   275.000000
15        60     98       120   215.200000
16        60    100       120   300.000000
17        45     90       112   375.790244
18        60    103       123   323.000000
19        45     97       125   243.000000
```

```
[17] # Select at least two columns and aggregate the data using: min, max, count, mean.
res = dst_Data.agg({'Calories': ['mean', 'min','max', 'count'],'Pulse': ['mean', 'min', 'max', 'count']})
print(res)
```

```
          Calories       Pulse
mean    375.790244  107.461538
min      50.300000   80.000000
max    1860.400000  159.000000
count   169.000000  169.000000
```

```python
# Filter the dataframe to select the rows with calories values between 500 and 1000
filter_dst_Data1=dst_Data[(dst_Data['Calories'] > 500) & (dst_Data['Calories'] < 1000)]
print(filter_dst_Data1)
# Filter the dataframe to select the rows with calories values > 500 and pulse < 100.
filter_dst_Data2=dst_Data[(dst_Data['Calories'] > 500) & (dst_Data['Pulse'] < 100)]
print(filter_dst_Data2)
```

```
     Duration  Pulse  Maxpulse  Calories
51         80    123       146     643.1
62        160    109       135     853.0
65        180     90       130     800.4
66        150    105       135     873.4
67        150    107       130     816.0
72         90    100       127     700.0
73        150     97       127     953.2
75         90     98       125     563.2
78        120    100       130     500.4
90        180    101       127     600.1
99         90     93       124     604.1
103        90     90       100     500.4
106       180     90       120     800.3
108        90     90       120     500.3
     Duration  Pulse  Maxpulse  Calories
65        180     90       130     800.4
70        150     97       129    1115.0
73        150     97       127     953.2
75         90     98       125     563.2
99         90     93       124     604.1
103        90     90       100     500.4
106       180     90       120     800.3
108        90     90       120     500.3
```

```python
# Create a new “df_modified” dataframe that contains all the columns from dst_data except for
#“Maxpulse”.
df_modified = dst_Data.loc[:, dst_Data.columns != 'Maxpulse']
print(df_modified)
```

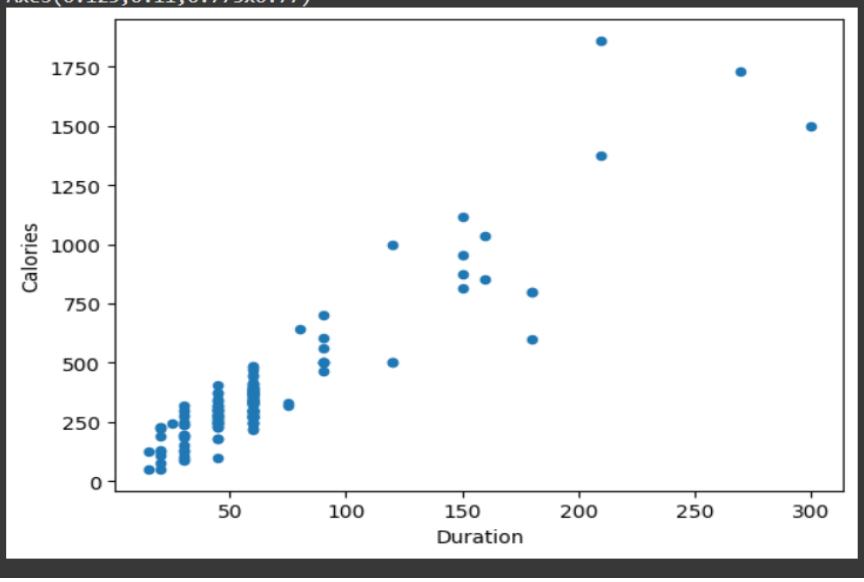
```
     Duration  Pulse  Calories
0          60    110     409.1
1          60    117     479.0
2          60    103     340.0
3          45    109     282.4
4          45    117     406.0
..        ...    ...       ...
164        60    105     290.8
165        60    110     300.0
166        60    115     310.2
167        75    120     320.4
168        75    125     330.4

[169 rows x 3 columns]
```

```python
[20] # Delete the “Maxpulse” column from the main dst_data dataframe
dst_Data.drop('Maxpulse', inplace=True, axis=1)
print(dst_Data.dtypes)
```

```
Duration      int64
Pulse         int64
Calories    float64
dtype: object
```

```
# Using pandas create a scatter plot for the two columns (Duration and Calories).
as1 = dst_Data.plot.scatter(x='Duration',y='Calories')
print(as1)
```

```
Axes(0.125,0.11;0.775x0.77)
```



2. Linear Regression

a) Import the given “Salary_Data.csv”

b) Split the data in train_test partitions, such that 1/3 of the data is reserved as test subset.

c) Train and predict the model.

d) Calculate the mean_squared error

e) Visualize both train and test data using scatter plot.

```
# 2. Import the given "Salary_Data.csv"
dst_Sal = pd.read_csv('/Salary_Data (2) (1) (1) (1).csv')
dst_Sal.info()
dst_Sal.head()
```

```
<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: 612.0 bytes
```

	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

```
[44] A = dst_Sal.iloc[:, :-1].values   #excluding last column i.e., years of experience column
     B = dst_Sal.iloc[:, 1].values     #only salary column
```

```
[45] # Split the data in train_test partitions, such that 1/3 of the data is reserved as test subset.
     from sklearn.model_selection import train_test_split
     A_train, A_test, B_train, B_test = train_test_split(A, B, test_size=1/3, random_state=0)
```

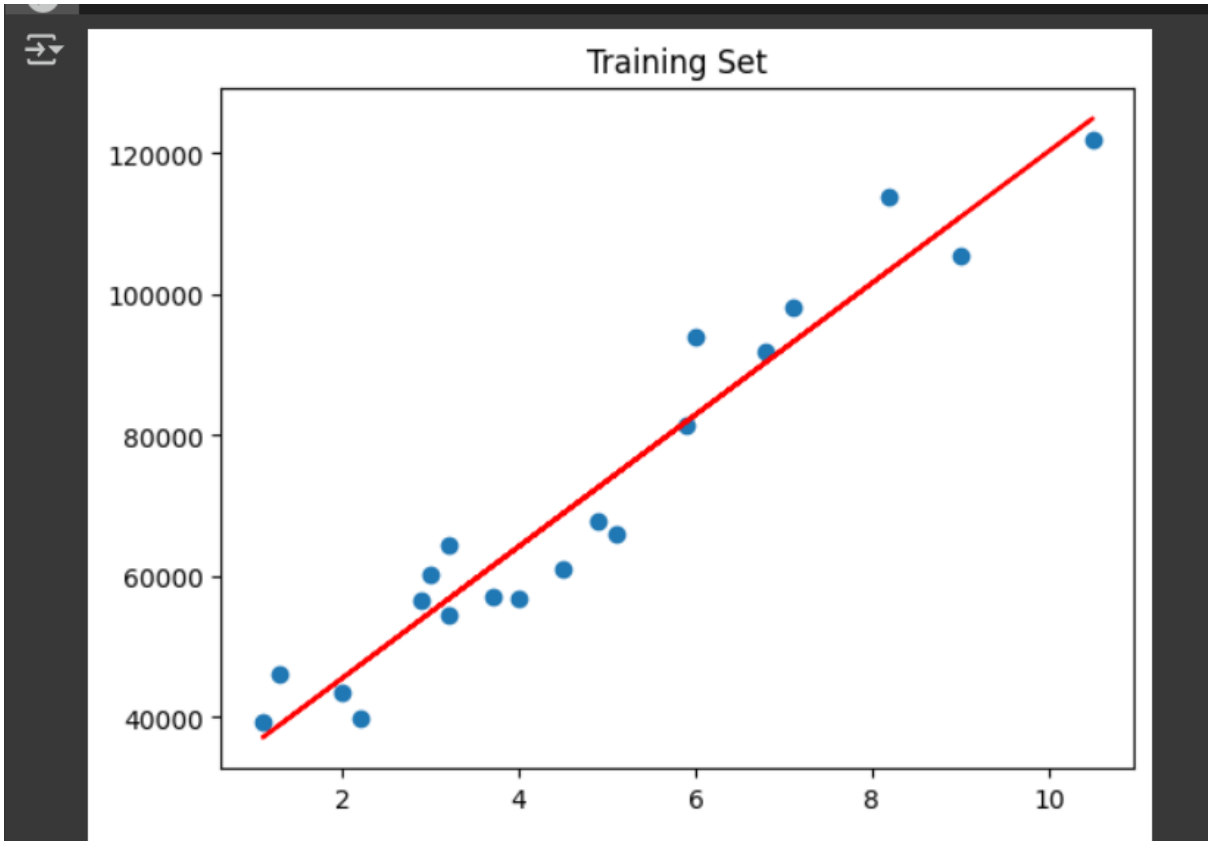
```
[52] # Train and predict the model.
     from sklearn.linear_model import LinearRegression
     reg = LinearRegression()
     reg.fit(A_train, B_train)
     B_Pred = reg.predict(A_test)
     B_Pred
```

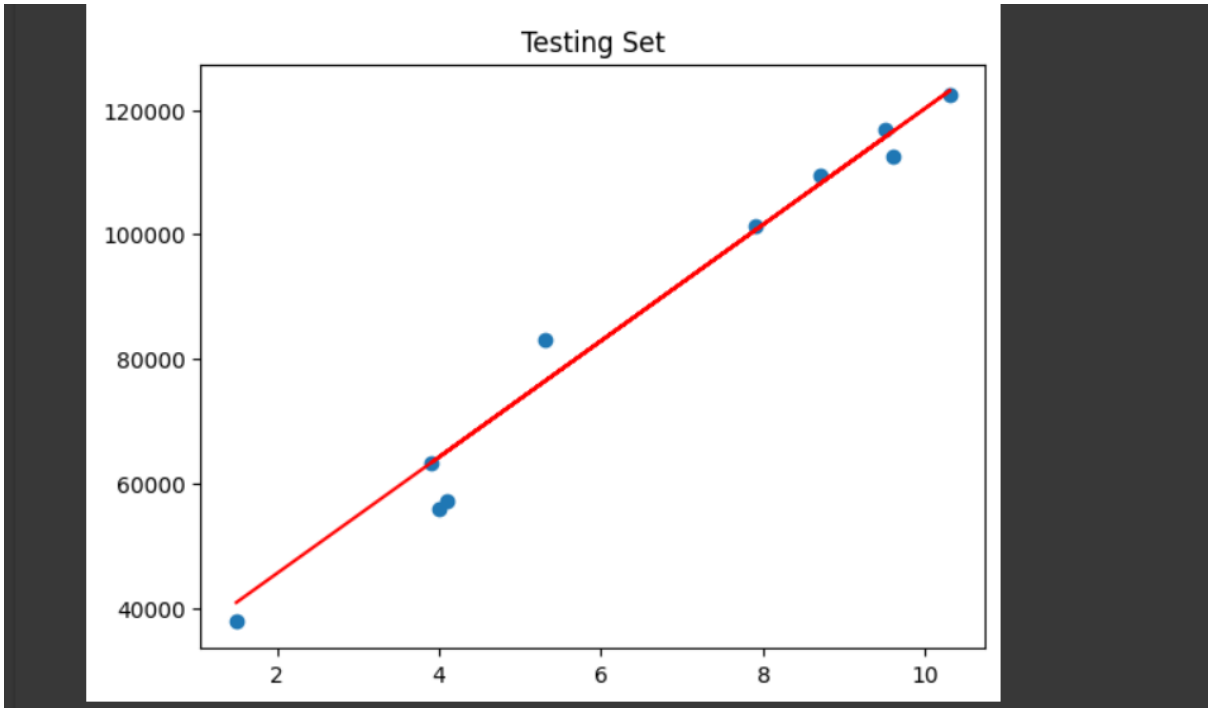
```
array([ 40835.10590871, 123079.39940819,  65134.55626083,  63265.36777221,
       115602.64545369, 108125.8914992 , 116537.23969801,  64199.96201652,
        76349.68719258, 100649.1375447 ])
```

```
[47] # Calculate the mean_squared error
     S_error = (B_Pred - B_test) ** 2
     Sum_Serror = np.sum(S_error)
     mean_squared_error = Sum_Serror / B_test.size
     mean_squared_error
```

```
21026037.329511296
```

```
# Visualize both train and test data using scatter plot.
import matplotlib.pyplot as plt
# Training Data set
plt.scatter(A_train, B_train)
plt.plot(A_train, reg.predict(A_train), color='red')
plt.title('Training Set')
plt.show()

# Testing Data set
plt.scatter(A_test, B_test)
plt.plot(A_test, reg.predict(A_test), color='red')
plt.title('Testing Set')
plt.show()
```


Training Set
120000
100000
80000
60000
40000
2
4
6
8
10


Testing Set
120000
100000
80000
60000
40000
2
4
6
8
10