Sales Predication Customer will buy product or not

April 29, 2023

1 Sales Predication From Existing Customer-Logitstic Regression

[3]:

```
import pandas as pd # useful for loading The dataset
import numpy as np # to perform array
```

2 Load Dataset

[4]:

```
dataset=pd.read_csv("DigitalAd_dataset.csv")
```

[5]:

```
dataset
```

[5]:

```
     Age  Salary  Status
0     18   82000       0
1     29   80000       0
2     47   25000       1
3     45   26000       1
4     46   28000       1
..   …       …       …
395   35   65000       0
396   26   80000       0
397   26   52000       0
398   20   86000       0
399   32   18000       0

[400 rows x 3 columns]
```

[6]:

```
dataset.shape
```

[6]:

```
(400, 3)
```

[8]:

```
dataset.isnull().sum()
```

[8]:

```
Age       0
Salary    0
Status    0
dtype: int64
```

3 Summarize Dataset

[7]:

```
dataset.head()
```

[7]:

```
   Age  Salary  Status
0   18   82000       0
1   29   80000       0
2   47   25000       1
3   45   26000       1
4   46   28000       1
```

4 Segregate Dataset into x(input/independentvariable)& y(output/DependentVariable)

[9]:

```
X=dataset.iloc[:,:-1].values
X
```

[9]:

```
array([[    18,  82000],
       [    29,  80000],
       [    47,  25000],
       [    45,  26000],
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       [    33,  28000],
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       [    26,  72000],
       [    27,  31000],
       [    27,  17000],
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       [    25,  33000],
       [    35,  65000],
       [    26,  80000],
       [    26,  52000],
       [    20,  86000],
       [    32,  18000]], dtype=int64)
```

[11]:

```
Y=dataset.iloc[:,-1].values
Y
```

```
[11]: array([0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 0, 0, 0, 0,
              0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0,
              0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0,
              0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0,
              0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
              0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0,
              1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0,
              1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0,
              0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 1,
              0, 0, 0, 1, 0, 0, 0, 1, 0, 1, 1, 1, 0, 0, 1, 1, 0, 1, 1, 0, 1, 1,
              0, 1, 0, 0, 0, 1, 1, 0, 1, 1, 0, 1, 0, 1, 0, 1, 0, 0, 1, 1, 0, 1,
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              1, 1, 0, 1, 1, 1, 0, 1, 0, 1, 0, 0, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0,
              1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0,
              0, 0, 0, 0], dtype=int64)
```

5 Splitting Dataset into Train & Test

```
[12]: from sklearn.model_selection import train_test_split
      X_train,X_test,Y_train,Y_test=train_test_split(X, Y, test_size=0.
       ↪25,random_state=0)
```

```
[14]: X_train
```

```
[14]: array([[    48,  90000],
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              [    32, 120000],
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              [    29,  75000],
              [    28,  89000],
              [    24,  89000],
              [    60,  83000],
              [    20,  86000],
              [    38,  71000],
              [    38,  55000],
              [    40,  78000],
              [    35,  73000],
              [    23,  63000],
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              [    21,  72000],
              [    35,  25000],
              [    35,  61000],
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              [    24,  27000],
              [    36,  54000],
              [    59,  76000],
              [    54,  26000],
              [    23,  48000],
              [    41,  59000],
              [    44, 139000],
              [    48, 138000],
              [    46,  88000],
              [    29,  83000],
              [    23,  82000],
              [    53,  34000],
              [    35,  59000],
              [    40,  60000],
              [    35, 108000],
              [    20,  36000],
              [    25,  22000],
              [    18,  86000],
              [    58,  95000],
              [    49,  65000],
              [    23,  20000],
              [    25,  79000],
              [    18,  68000],
              [    35,  22000],
              [    49,  39000],
              [    37, 137000],
              [    46,  74000],
              [    25,  90000],
              [    46, 117000],
              [    57,  33000],
              [    19,  26000],
              [    37,  55000],
              [    42,  90000],
              [    38,  61000],
              [    52, 150000],
              [    40,  57000],
              [    26,  84000],
              [    50,  36000],
              [    24,  55000],
              [    54, 108000],
              [    27,  31000],
              [    31,  34000],
              [    37,  75000],
              [    36,  33000],
              [    35,  72000],
              [    19,  19000],
              [    35,  23000],
              [    52, 114000],
              [    36, 118000],
              [    32,  86000],
              [    30,  62000],
              [    28,  59000],
              [    51, 134000],
              [    41,  72000],
              [    49,  89000],
              [    37,  53000],
              [    45,  22000],
              [    59, 130000],
              [    46,  22000],
              [    42, 108000],
              [    35,  79000],
              [    55, 130000],
              [    33,  31000],
              [    25,  87000],
              [    20,  82000]], dtype=int64)
```

[15]:
```
Y_train
```

[15]:
```
array([1, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 1, 0, 0, 1, 1, 1, 1, 1, 0, 0, 0,
       0, 0, 1, 0, 0, 0, 1, 1, 0, 1, 0, 0, 1, 0, 0, 1, 1, 1, 0, 0, 0, 0,
       1, 0, 0, 1, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 0, 1, 0, 0, 0, 1, 0, 1,
       1, 0, 0, 1, 0, 1, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0,
       0, 1, 0, 0, 1, 0, 1, 0, 0, 1, 1, 1, 0, 0, 1, 0, 1, 1, 1, 0, 0, 0,
       0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1,
       1, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 1, 1, 1, 0, 0, 0, 0, 0, 1, 0, 0,
       0, 1, 1, 0, 0, 0, 1, 0, 0, 1, 1, 1, 1, 0, 0, 0, 1, 1, 1, 0, 1, 0,
       1, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 1, 1, 0, 0, 1, 0, 0, 1, 0, 0, 0,
       0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0,
       0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 1,
       1, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 1, 1, 0, 0, 1,
       1, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0,
       0, 0, 0, 1, 0, 1, 1, 0, 1, 0, 1, 0, 0, 0], dtype=int64)
```

[16]:
```
X_test
```

[16]:
```
array([[    27,  96000],
       [    48,  30000],
       [    60,  34000],
       [    48,  96000],
       [    35,  77000],
       [    32,  18000],
       [    29,  47000],
       [    57,  74000],
       [    31,  15000],
       [    40,  72000],
       [    18,  44000],
       [    29,  61000],
       [    26,  32000],
       [    47,  50000],
       [    49,  28000],
       [    33, 113000],
       [    47, 113000],
       [    40,  47000],
       [    41,  80000],
       [    35,  58000],
       [    24,  84000],
       [    37,  70000],
       [    28,  59000],
       [    40,  71000],
       [    28,  32000],
       [    42,  75000],
       [    26,  15000],
       [    31,  18000],
       [    58,  38000],
       [    35,  75000],
       [    33,  60000],
       [    35,  55000],
       [    39,  77000],
       [    53, 143000],
       [    26,  17000],
       [    22,  81000],
       [    19,  21000],
       [    33,  41000],
       [    19,  70000],
       [    32,  18000],
       [    42,  80000],
       [    58, 144000],
       [    45,  22000],
       [    29,  80000],
       [    39,  96000],
       [    22,  63000],
       [    47,  34000],
       [    40,  61000],
       [    26, 118000],
       [    57, 122000],
       [    36, 144000],
       [    26,  30000],
       [    36, 125000],
       [    31,  66000],
       [    35,  57000],
       [    42,  65000],
       [    24,  19000],
       [    46,  23000],
       [    27,  17000],
       [    32, 117000],
       [    26,  81000],
       [    37,  62000],
       [    46,  28000],
       [    38,  71000],
       [    47,  47000],
       [    56,  60000],
       [    32, 135000],
       [    48,  29000],
       [    29, 148000],
       [    48, 131000],
       [    47,  49000],
       [    57,  26000],
       [    20,  49000],
       [    27,  90000],
       [    37,  72000],
       [    29,  43000],
       [    42,  53000],
       [    45,  32000],
       [    46,  32000],
       [    47,  51000],
       [    38, 113000],
       [    28,  87000],
       [    31,  68000],
       [    36,  75000],
       [    39,  79000],
       [    56, 104000],
       [    20,  82000],
       [    39,  71000],
       [    35,  65000],
       [    39, 122000],
       [    39,  59000],
       [    37,  74000],
       [    25,  80000],
       [    48,  41000],
       [    58, 101000],
       [    32, 100000],
       [    20,  74000],
       [    19,  76000],
       [    52,  38000],
       [    41,  87000]], dtype=int64)
```

6 Feature Scaling

[17]:

```
from sklearn.preprocessing import StandardScaler
sc=StandardScaler()
X_train=sc.fit_transform(X_train)
X_test=sc.transform(X_test)
```

7 Training

[18]:

```
from sklearn.linear_model import LogisticRegression
model=LogisticRegression(random_state=0)
model.fit(X_train,Y_train)
```

[18]:

```
LogisticRegression(random_state=0)
```

8 Predicting, Wheather new Customer with Age & Salary will Buy or Not

[20]:

```
age = int(input("Enter New Customer Age: "))
sal = int(input("Enter New Customer Salary: "))
newCust = [[age,sal]]
result = model.predict(sc.transform(newCust))
print(result)
if result == 1:
  print("Customer will Buy")
else:
  print("Customer won't Buy")
```

```
Enter New Customer Age: 60
Enter New Customer Salary: 70000
[1]
Customer will Buy
```

9 Prediction for all Test Data

[25]:

```
y_pred = model.predict(X_test)
print(np.concatenate((y_pred.reshape(len(y_pred),1), Y_test.
 ↪reshape(len(Y_test),1)),1))
```

```
[[0 1]
 [0 1]
 [1 1]
 [1 1]
 [0 0]
 [0 0]
 [0 0]
 [1 1]
 [0 0]
 [0 0]
 [0 0]
 [0 0]
 [0 0]
 [0 1]
 [0 1]
 [0 0]
 [1 1]
 [0 0]
 [0 0]
 [0 0]
 [0 0]
 [0 1]
 [0 0]
```

```
[0 1]
[0 0]
[0 0]
[0 0]
[0 0]
[1 1]
[0 0]
[0 0]
[0 0]
[0 0]
[1 1]
[0 0]
[0 0]
[0 0]
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[0 0]
[0 0]
[1 1]
[0 1]
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[0 1]
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[0 0]
[1 1]
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[0 1]
[0 1]
[1 1]
[0 1]
```

```
 [1 1]
 [0 0]
 [0 0]
 [0 0]
 [0 0]
 [0 0]
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 [1 1]
 [0 0]
 [0 0]
 [0 0]
 [0 1]
 [1 1]
 [0 1]
 [0 0]
 [0 0]
 [1 1]
 [1 1]]
```

10 Evaluating Model-Confusion matrix

[27]:

```
from sklearn.metrics import confusion_matrix, accuracy_score
cm = confusion_matrix(Y_test, y_pred)

print("Confusion Matrix: ")
print(cm)

print("Accuracy of the Model: {0}%".format(accuracy_score(Y_test, y_pred)*100))
```

```
Confusion Matrix:
[[61  0]
 [20 19]]
Accuracy of the Model: 80.0%
```

[ ]: