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#PIN NO : 21X05A6724 COLLAGE : NARASIMHA REDDY ENGINEERING COLLAGE

PROJECT TITLE:To predict the heartattack diseases for organization (WHO:world Health Organization) using machine learning algorithm rate of heart attack disease will increasing manner or discreasing manner

Problem statement: A WHO estimated 12 millions death records. One of them half off the death result is found in US. Theresearch scholars point out the relevant risk factor of heart attack as a DataScience engineer predict the overall risk using ML algorithm(Logistic Regression)

Task:

1) Import the libraries required for prediction.

2) Import the Dataset using workspace.

3) Use the appropriate argument of sklearn Library to train,test and split the dataset

4) Fit your values with a range function using feature scalling

5) Check your model accuracy and precison using confusion matrix

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

data = pd.read_csv("framingham.csv")
data
```

```
      male  age  education  currentSmoker  cigsPerDay  BPMeds  \
0        1   39        4.0              0         0.0     0.0
1        0   46        2.0              0         0.0     0.0
2        1   48        1.0              1        20.0     0.0
3        0   61        3.0              1        30.0     0.0
4        0   46        3.0              1        23.0     0.0
...    ...  ...        ...            ...         ...     ...
4233     1   50        1.0              1         1.0     0.0
4234     1   51        3.0              1        43.0     0.0
4235     0   48        2.0              1        20.0     NaN
4236     0   44        1.0              1        15.0     0.0
4237     0   52        2.0              0         0.0     0.0

      prevalentStroke  prevalentHyp  diabetes  totChol  sysBP  diaBP
BMI  \
0                   0             0         0    195.0  106.0   70.0
26.97
1                   0             0         0    250.0  121.0   81.0
28.73
```

```
2                    0             0          0    245.0  127.5   80.0
25.34
3                    0             1          0    225.0  150.0   95.0
28.58
4                    0             0          0    285.0  130.0   84.0
23.10
...                ...           ...        ...      ...    ...    ...
...
4233                 0             1          0    313.0  179.0   92.0
25.97
4234                 0             0          0    207.0  126.5   80.0
19.71
4235                 0             0          0    248.0  131.0   72.0
22.00
4236                 0             0          0    210.0  126.5   87.0
19.16
4237                 0             0          0    269.0  133.5   83.0
21.47

      heartRate  glucose  TenYearCHD
0          80.0     77.0           0
1          95.0     76.0           0
2          75.0     70.0           0
3          65.0    103.0           1
4          85.0     85.0           0
...         ...      ...         ...
4233       66.0     86.0           1
4234       65.0     68.0           0
4235       84.0     86.0           0
4236       86.0      NaN           0
4237       80.0    107.0           0

[4238 rows x 16 columns]

pd.isnull(data)

       male    age  education  currentSmoker  cigsPerDay  BPMeds  \
0     False  False      False          False       False   False
1     False  False      False          False       False   False
2     False  False      False          False       False   False
3     False  False      False          False       False   False
4     False  False      False          False       False   False
...     ...    ...        ...            ...         ...     ...
4233  False  False      False          False       False   False
4234  False  False      False          False       False   False
4235  False  False      False          False       False    True
4236  False  False      False          False       False   False
4237  False  False      False          False       False   False

      prevalentStroke  prevalentHyp  diabetes  totChol  sysBP  diaBP
```

```
BMI  \
0               False         False     False    False  False  False
False
1               False         False     False    False  False  False
False
2               False         False     False    False  False  False
False
3               False         False     False    False  False  False
False
4               False         False     False    False  False  False
False
...               ...           ...       ...      ...    ...    ...
...
4233            False         False     False    False  False  False
False
4234            False         False     False    False  False  False
False
4235            False         False     False    False  False  False
False
4236            False         False     False    False  False  False
False
4237            False         False     False    False  False  False
False

      heartRate  glucose  TenYearCHD
0         False    False       False
1         False    False       False
2         False    False       False
3         False    False       False
4         False    False       False
...         ...      ...         ...
4233      False    False       False
4234      False    False       False
4235      False    False       False
4236      False     True       False
4237      False    False       False

[4238 rows x 16 columns]
```

```
X = data[["age"]]
y = data["currentSmoker"]
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=0)

print(X_train)
```

```
      age
4203   63
3534   52
```

```
1736   38
541    49
2526   40
...   ...
1033   44
3264   51
1653   39
2607   57
2732   40

[3390 rows x 1 columns]
```

```
print(y_train)
```

```
4203    1
3534    1
1736    1
541     0
2526    0
       ..
1033    0
3264    1
1653    1
2607    0
2732    1
Name: currentSmoker, Length: 3390, dtype: int64
```

```
print(X_test)
```

```
      age
1669   47
156    58
87     61
685    45
666    57
...   ...
245    46
4215   63
548    50
4225   45
2996   50

[848 rows x 1 columns]
```

```
print(y_test)
```

```
1669    0
156     0
87      1
685     0
666     0
```

```
      ..
245    1
4215   0
548    1
4225   1
2996   0
Name: currentSmoker, Length: 848, dtype: int64
```

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

print(X_train)
```

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[[ 1.57197395]
 [ 0.28779517]
 [-1.34661418]
 ...
 [-1.22987065]
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```
print(X_test)
```

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[[-0.29592245]
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```

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 [-1.11312713]
 [-0.41266598]
 [ 1.57197395]
 [ 0.05430812]
 [-0.5294095 ]
 [ 0.05430812]]
```

```
from sklearn.linear_model import LogisticRegression
classifier = LogisticRegression(random_state = 0)
classifier.fit(X_train, y_train)
```

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

```
y_pred = classifier.predict(X_test)
y_pred
```

```
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0,
```

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0,
       0, 1, 1, 1, 0, 1, 1, 1, 0, 0, 1, 0])
```

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

```
[[268 185]
 [155 240]]
```

```
0.5990566037735849
```

Conclusion:

According to the model analysis the Logistic Regression Algorithm works successfully with 0.6 accuracy.The accuracy shows that building model is *successfull*