In [1]:
```python
import numpy as np
import pandas as pd
import seaborn as sn
import matplotlib.pyplot as plt
```

In [2]:
```python
var=pd.read_csv('C://Users/Gopi/Desktop/data.csv')
```

In [3]:
```python
print(var.shape)
```

```
(768, 10)
```

In [4]:
```python
var.isnull().mean().head()
```

Out[4]:
```
num_preg        0.0
glucose_conc    0.0
diastolic_bp    0.0
thickness       0.0
insulin         0.0
dtype: float64
```

In [5]:
```python
var.isnull().values.any()
```

Out[5]:
```
False
```

In [6]:
```python
diabetes_dummies = {True: 1, False: 0}
```

In [7]:
```python
var['diabetes'] = var['diabetes'].map(diabetes_dummies)
```

In [8]:
```python
var.head()
```

Out[8]:

	num_preg	glucose_conc	diastolic_bp	thickness	insulin	bmi	diab_pred	age	skin	diabetes
0	6	148	72	35	0	33.6	0.627	50	1.3790	1
1	1	85	66	29	0	26.6	0.351	31	1.1426	0
2	8	183	64	0	0	23.3	0.672	32	0.0000	1
3	1	89	66	23	94	28.1	0.167	21	0.9062	0
4	0	137	40	35	168	43.1	2.288	33	1.3790	1

In [9]:
```python
var['diabetes'].value_counts()
```

Out[9]:
```
0    500
1    268
Name: diabetes, dtype: int64
```

In [10]:
```python
X_columns = ['num_preg', 'glucose_conc', 'diastolic_bp', 'insulin', 'bmi', 'diab_pred', 'age', 'ski
n']
y_columns = ['diabetes']
```

In [11]:
```python
X = var[X_columns].values
y = var[y_columns].values
```

In [12]:
```python
X=pd.DataFrame(X)
y=pd.DataFrame(y)
```

In [13]:
```python
from sklearn.model_selection import train_test_split
X_train ,X_test ,y_train ,y_test =train_test_split(X,y,test_size=0.30)
```

In [14]:
```python
print(X_train.shape)
print(X_test.shape)
print(y_train.shape)
print(y_test.shape)
```

```
(537, 8)
(231, 8)
(537, 1)
(231, 1)
```

K-Nearest Neighbour

In [15]:
```python
# selecting the K value
import math
print(math.sqrt(len(y_test)))
```

```
15.198684153570664
```

In [16]:
```python
from sklearn.neighbors import KNeighborsClassifier
knn = KNeighborsClassifier(n_neighbors=15)

knn.fit(X_train,y_train)

y_pred=knn.predict(X_test)

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

from sklearn.model_selection import cross_val_score
k=cross_val_score(knn,X,y,cv=10)
print(k)
k.max()
```

```
C:\Users\Gopi\Anaconda3\lib\site-packages\ipykernel_launcher.py:4: DataConversionWarning: A colu
mn-vector y was passed when a 1d array was expected. Please change the shape of y to (n_samples,
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of y to (n_samples, ), for example using ravel().
  estimator.fit(X_train, y_train, **fit_params)
```

```
[[130  34]
 [ 24  43]]
0.7489177489177489
[0.75324675 0.76623377 0.7012987  0.63636364 0.7012987  0.83116883
 0.75324675 0.80519481 0.81578947 0.78947368]
```

```
C:\Users\Gopi\Anaconda3\lib\site-packages\sklearn\model_selection\_validation.py:516: DataConver
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  estimator.fit(X_train, y_train, **fit_params)
```

Out[16]:
```
0.8311688311688312
```

NB Classifier

In [17]:
```python
from sklearn.naive_bayes import GaussianNB
nb= GaussianNB()

nb.fit(X_train,y_train)

y_pred=nb.predict(X_test)

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

from sklearn.model_selection import cross_val_score
n=cross_val_score(nb,X,y,cv=10)
print(n.max())
```

```
C:\Users\Gopi\Anaconda3\lib\site-packages\sklearn\utils\validation.py:724: DataConversionWarnin
g: A column-vector y was passed when a 1d array was expected. Please change the shape of y to (n
_samples, ), for example using ravel().
  y = column_or_1d(y, warn=True)
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```

```
[[127  32]
 [ 27  45]]
```

```
C:\Users\Gopi\Anaconda3\lib\site-packages\sklearn\utils\validation.py:724: DataConversionWarnin
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_samples, ), for example using ravel().
  y = column_or_1d(y, warn=True)
```

```
0.8051948051948052
```

Decision Tree

In [18]:
```python
from sklearn.tree import DecisionTreeClassifier
tree = DecisionTreeClassifier(criterion = 'entropy', random_state = 0)

tree.fit(X_train,y_train)

y_pred=tree.predict(X_test)

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

from sklearn.model_selection import cross_val_score
tr=cross_val_score(tree,X,y,cv=10)
print(tr)
tr.max()
```

```
[[124  31]
 [ 30  46]]
0.7359307359307359
[0.7012987  0.68831169 0.64935065 0.62337662 0.68831169 0.74025974
 0.77922078 0.79220779 0.65789474 0.65789474]
```

Out[18]:
```
0.7922077922077922
```

Random Forest

In [19]:
```python
from sklearn.ensemble import RandomForestClassifier
forest = RandomForestClassifier(n_estimators = 10, criterion = 'entropy', random_state = 0)

forest.fit(X_train,y_train)

y_pred=forest.predict(X_test)

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

from sklearn.model_selection import cross_val_score
fo=cross_val_score(forest,X,y,cv=10)
print(fo)
fo.max()
```

```
[[135  42]
 [ 19  35]]
0.7359307359307359
```

```
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