ml-5

November 3, 2023

[1]:
```
#Importing the necessary libraries
import pandas as pd
import seaborn as sns
```

[6]:
```
#Reading the excel file
df=pd.read_csv("diabetes .csv")
```

[7]:
```
df
```

[7]:

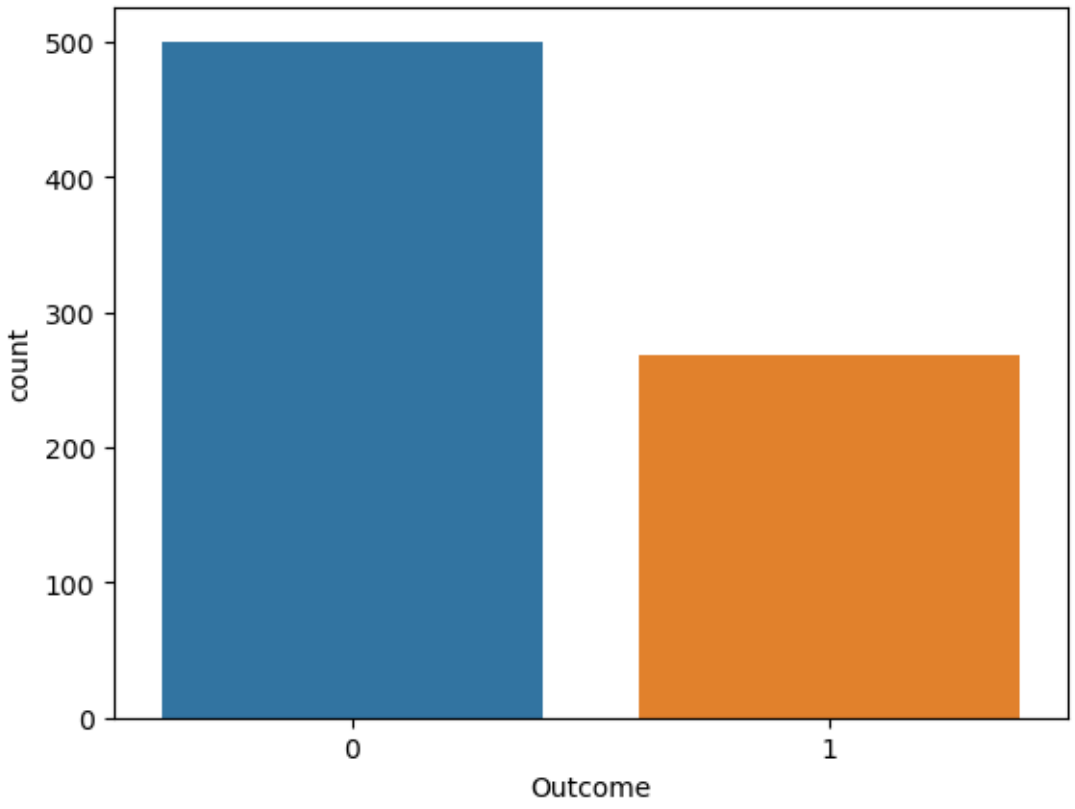
	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	Pedigree	Age	Outcome
0	6	148	72	35	0	33.6	0.627	50	1
1	1	85	66	29	0	26.6	0.351	31	0
2	8	183	64	0	0	23.3	0.672	32	1
3	1	89	66	23	94	28.1	0.167	21	0
4	0	137	40	35	168	43.1	2.288	33	1
..	…	…	…	…	…	…	…	…	…
763	10	101	76	48	180	32.9	0.171	63	0
764	2	122	70	27	0	36.8	0.340	27	0
765	5	121	72	23	112	26.2	0.245	30	0
766	1	126	60	0	0	30.1	0.349	47	1
767	1	93	70	31	0	30.4	0.315	23	0

[768 rows x 9 columns]

[10]:
```
# input data
x = df.drop('Outcome', axis = 1)

# output data
y = df['Outcome']
```

[11]:
```
sns.countplot(x = y);
```



[12]:
```
y.value_counts()
```

[12]:
```
0    500
1    268
Name: Outcome, dtype: int64
```

[13]:
```
# Feature scaling
from sklearn.preprocessing import MinMaxScaler
scaler = MinMaxScaler()
x_scaled = scaler.fit_transform(x)
```

[15]:
```
# Cross - validation
from sklearn.model_selection import train_test_split
```

```
x_train, x_test, y_train, y_test = train_test_split(
x, y, random_state=0, test_size=0.25)
```

[16]:
```
x.shape
```

[16]: (768, 8)

[17]:
```
x_train.shape
```

[17]: (576, 8)

[18]:
```
x_test.shape
```

[18]: (192, 8)

[19]:
```
from sklearn.neighbors import KNeighborsClassifier
```

[20]:
```
knn = KNeighborsClassifier(n_neighbors=5)
```

[21]:
```
knn.fit(x_train, y_train)
```

[21]: KNeighborsClassifier()

[22]:
```
from sklearn.metrics import accuracy_score, ConfusionMatrixDisplay
from sklearn.metrics import classification_report
```

[24]:
```
y_pred = knn.predict(x_test)
```

```
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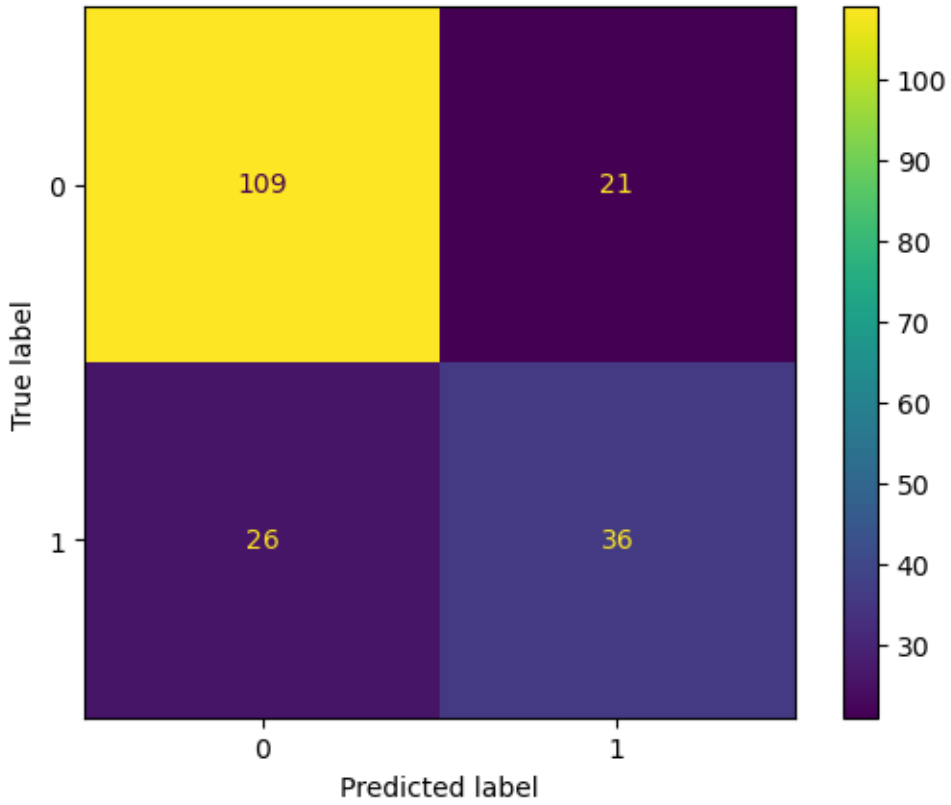
```

[25]:
```
ConfusionMatrixDisplay.from_predictions(y_test, y_pred)
```

[25]: <sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x213a0b11ac0>



[26]:
```
print(classification_report(y_test, y_pred))
```

```
              precision    recall  f1-score   support

           0       0.81      0.84      0.82       130
           1       0.63      0.58      0.61        62

    accuracy                           0.76       192
   macro avg       0.72      0.71      0.71       192
weighted avg       0.75      0.76      0.75       192
```

[27]:
```
import matplotlib.pyplot as plt
import numpy as np
```

[34]:
```
error = []
for k in range(1,41):
    knn = KNeighborsClassifier(n_neighbors =k)
    knn.fit(x_train, y_train)
    pred = knn.predict(x_test)
    error.append(np.mean(pred != y_test))
```

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reduction functions (e.g. `skew`, `kurtosis`), the default behavior of `mode`
typically preserves the axis it acts along. In SciPy 1.11.0, this behavior will
change: the default value of `keepdims` will become False, the `axis` over which
the statistic is taken will be eliminated, and the value None will no longer be
accepted. Set `keepdims` to True or False to avoid this warning.
  mode, _ = stats.mode(_y[neigh_ind, k], axis=1)
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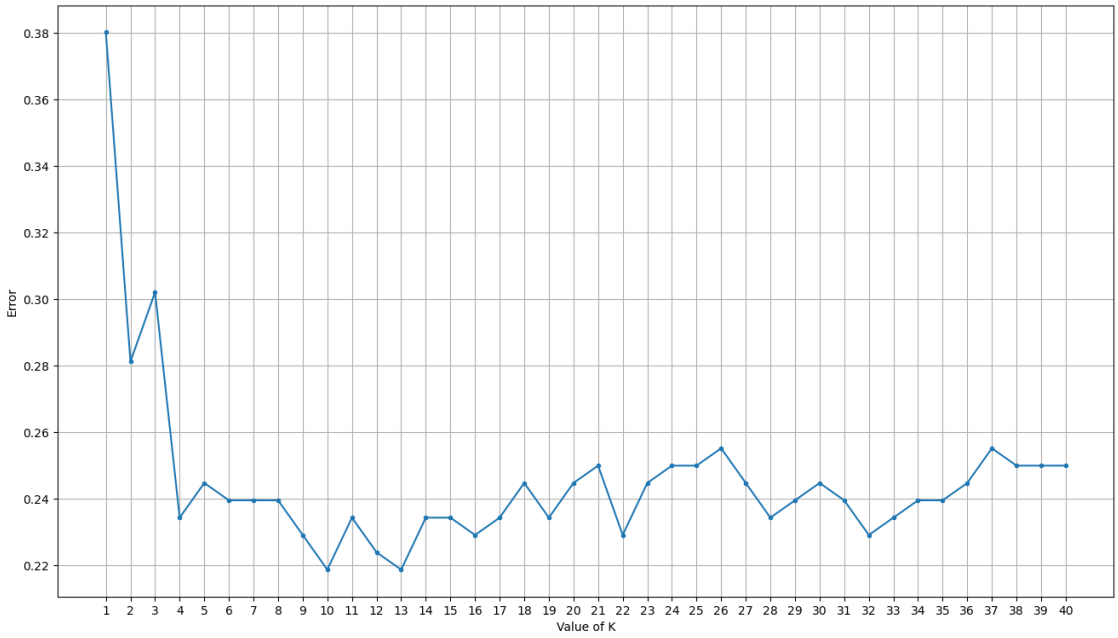
  mode, _ = stats.mode(_y[neigh_ind, k], axis=1)
```

[35]:
```
plt.figure(figsize=(16,9))
plt.xlabel('Value of K')
plt.ylabel('Error')
plt.grid()
plt.xticks(range(1,41))
plt.plot(range(1,41), error, marker='.')
```

[35]:
```
[<matplotlib.lines.Line2D at 0x213a3356be0>]
```



[36]:
```
knn = KNeighborsClassifier(n_neighbors=33)
```

[37]:
```
knn.fit(x_train, y_train)
```

[37]:
```
KNeighborsClassifier(n_neighbors=33)
```

[38]:
```
y_pred = knn.predict(x_test)
```

```
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accepted. Set `keepdims` to True or False to avoid this warning.
  mode, _ = stats.mode(_y[neigh_ind, k], axis=1)
```

[39]:
```
print(classification_report(y_test, y_pred))
```

```
              precision    recall  f1-score   support

           0       0.78      0.91      0.84       130
           1       0.71      0.47      0.56        62

    accuracy                           0.77       192
   macro avg       0.74      0.69      0.70       192
```

```
weighted avg       0.76      0.77      0.75       192
```

[ ]: