Experiment 3.2

Implementation of Principal component Analysis

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Semester: 5th Semester **Date of Performance: 27/10/2022**
Subject Name: Machine Learning Lab **Subject Code: 20CSP-317**

Aim: Implementation of Principal component Analysis.

Objective: To prepare a model with Principal component Analysis.

Data Set Chosen: Principal component Analysis

Result and output:

Implementation of Principal component Analysis

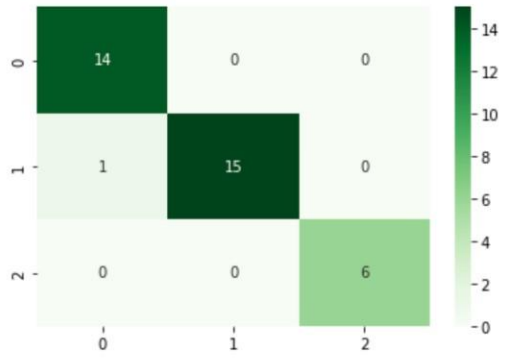
In [1]:
```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import seaborn as sns


dataset = pd.read_csv('Wine.csv')
dataset.head()
```

Out[1]:

	Alcohol	Malic_Acid	Ash	Ash_Alcanity	Magnesium	Total_Phenols	Flavanoids	Nonflavanoid_Phenols	Proanthocyanins	Colc
0	14.23	1.71	2.43	15.6	127	2.80	3.06	0.28	2.29	
1	13.20	1.78	2.14	11.2	100	2.65	2.76	0.26	1.28	
2	13.16	2.36	2.67	18.6	101	2.80	3.24	0.30	2.81	
3	14.37	1.95	2.50	16.8	113	3.85	3.49	0.24	2.18	
4	13.24	2.59	2.87	21.0	118	2.80	2.69	0.39	1.82	

In [3]:
```
X = dataset.iloc[:, 0:13].values
y = dataset.iloc[:, 13].values


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)


from sklearn.preprocessing import StandardScaler
sc = StandardScaler()

X_train = sc.fit_transform(X_train)
X_test = sc.transform(X_test)


from sklearn.decomposition import PCA

pca = PCA(n_components = 2)

X_train = pca.fit_transform(X_train)
X_test = pca.transform(X_test)

explained_variance = pca.explained_variance_ratio_


from sklearn.linear_model import LogisticRegression

classifier = LogisticRegression(random_state = 0)
classifier.fit(X_train, y_train)


y_pred = classifier.predict(X_test)

from sklearn.metrics import accuracy_score
from sklearn.metrics import confusion_matrix
from sklearn.metrics import classification_report


cm = confusion_matrix(y_test, y_pred)
cm

sns.heatmap(confusion_matrix(y_test,y_pred),annot = True,cmap = 'Greens')
```

Out[3]: <AxesSubplot:>



```
In [4]: cr = classification_report(y_test, y_pred)
        cr

Out[4]: '              precision    recall  f1-score   support\n\n           1       0.93      1.00
        0.97        14\n           2       1.00      0.94      0.97        16\n           3       1.0
        0      1.00      1.00         6\n\n    accuracy                           0.97        36\n
        macro avg       0.98      0.98      0.98        36\nweighted avg       0.97      0.97      0.
        97        36\n'

In [6]: ac = accuracy_score(y_test, y_pred)
        ac

Out[6]: 0.9722222222222222
```

Result: Accuracy of the model is approximately 95%.