EXPT NO: 6 **A python program to implement face recognition**

DATE: 24/10/2024 **using Support Vector Machine.**

AIM:

To write a python program to implement face recognition using SVM.

PROCEDURE:

Implementing face recognition using svm involves the following steps:

Step 1: Import Necessary Libraries

First, import the libraries that are essential for data manipulation, visualization, and model building.

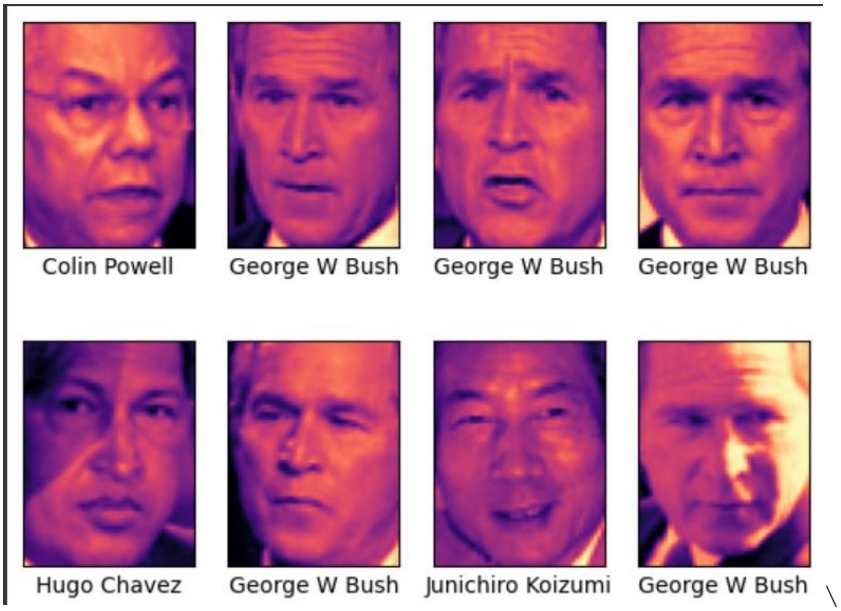
```
from sklearn.datasets import fetch_lfw_people
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.pipeline import make_pipeline
from sklearn.decomposition import PCA as RandomizedPCA
from sklearn.metrics import accuracy_score
```

Step 2: Load the Dataset

The dataset can be loaded and display the first few faces of the dataset.

```
faces = fetch_lfw_people(min_faces_per_person=60)
fig, splts = plt.subplots(2, 4)
 for i, splts in enumerate(splts.flat):
     splts.imshow(faces.images[i], cmap='magma')
     splts.set(xticks=[], yticks=[],
             xlabel=faces.target_names[faces.target[i]])
```

OUTPUT:



Step 4: Split the Data

Split the data into training and testing sets.
Fit the dataset to the model.

```
X = faces.data
y = faces.target

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.4,
random_state=42)
```

Step 5:
Dimensionality Reduction

Reduce the dimension using Principal Component Analysis (PCA)
Fit the model with SVC.

```
pca = RandomizedPCA(n_components=150, whiten=True, random_state=42)
svc = SVC(kernel='rbf', class_weight='balanced')
model = make_pipeline(pca, svc)
model.fit(X_train, y_train)
```

Step 6: Make Predictions

Use the model to make predictions on the test data.

```
predictions = model.predict(X_test)
```

Step 7: Evaluate the Model

Evaluate the model performance using metrics like Accuracy Score and confusion_matrix

OUTPUT :

```
predictions = model.predict(X_test)
accuracy = accuracy_score(predictions, y_test)
print(accuracy)
matrix = confusion_matrix(predictions, y_test)
print(matrix)
```

```
0.8074074074074075
[[ 15   1   1   0   0   0   0   0]
 [  4 101   4  20   3   8   1   9]
 [  2   0  39   1   0   0   0   0]
 [  2   4   5 183   5   7   4  10]
 [  0   0   0   1  28   5   0   0]
 [  0   0   0   0   0  13   0   0]
 [  0   0   0   0   0   0  16   0]
 [  0   2   1   0   3   1   0  41]]
```

RESULT:

This step-by-step process will help us to implement face recognition using SVM and analyzed their performance.