EXPERIMENT-6

A python program to do face recognition using SVM classifier.

AIM:

To implement a python program to do face recognition using SVM classifier.

CODE:

```
import numpy as np import pandas as pd import
matplotlib.pyplot as plt import seaborn as sns from sklearn
import svm from sklearn.metrics import confusion_matrix,
classification_report from sklearn.model_selection import
train_test_split
 # Set Seaborn style sns.set(font_scale=1.2)

recipes =

pd.read_csv('/content/recipes_muffins_cupcakes.csv')


# Display first few rows print(recipes.head())


# Show shape print("Shape of dataset:",
recipes.shape)
 # Select features and labels sugar_flour = recipes[['Sugar',

'Flour']].values type_label = np.where(recipes['Type'] == 'Muffin', 0, 1)
```

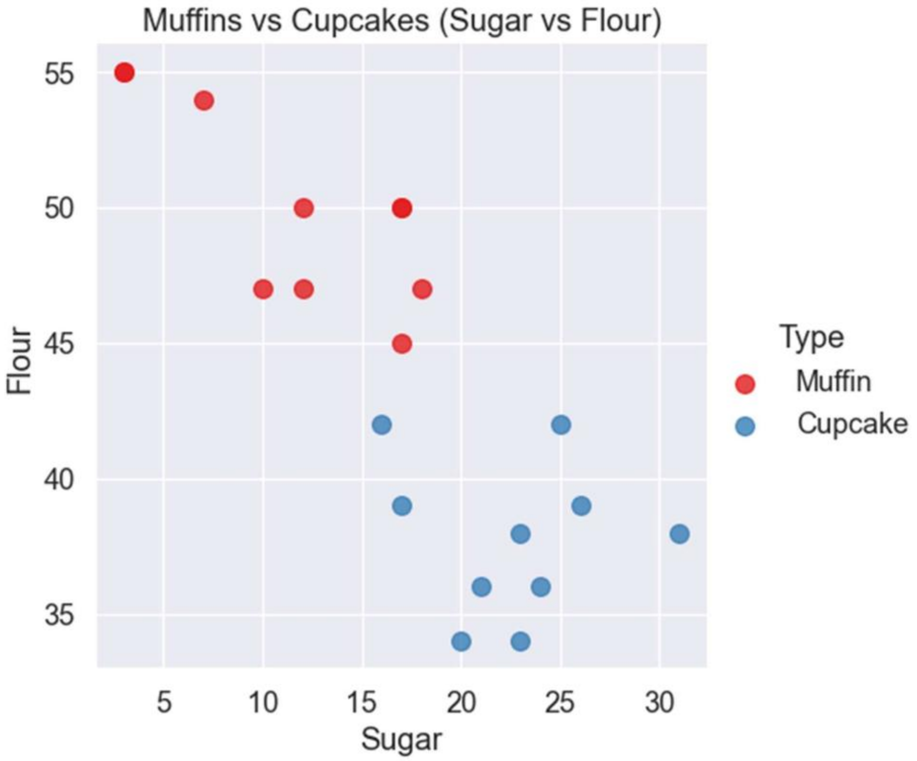
```
# Create and train SVM model model =
svm.SVC(kernel='linear')
model.fit(sugar_flour, type_label)

# Extract hyperplane parameters w =
model.coef_[0] a = -w[0] / w[1] xx =
np.linspace(5, 35) yy = a * xx -
(model.intercept_[0] / w[1])


# Calculate margins b_down =
model.support_vectors_[0] yy_down = a * xx +
(b_down[1] - a * b_down[0]) b_up =
model.support_vectors_[-1] yy_up = a * xx + (b_up[1]
- a * b_up[0])


# Plot decision boundary sns.lmplot(x='Sugar', y='Flour', data=recipes,
hue='Type', palette='Set1',           fit_reg=False, scatter_kws={"s":70})
plt.plot(xx, yy, 'k-', linewidth=2, label="Decision Boundary")
plt.plot(xx, yy_down, 'k--') plt.plot(xx, yy_up, 'k--')
plt.scatter(model.support_vectors_[:, 0],
model.support_vectors_[:, 1],
            s=100, facecolors='none', edgecolors='k', label="Support Vectors")
plt.title("SVM Linear Separation for Muffins vs Cupcakes")
plt.legend() plt.show()
```

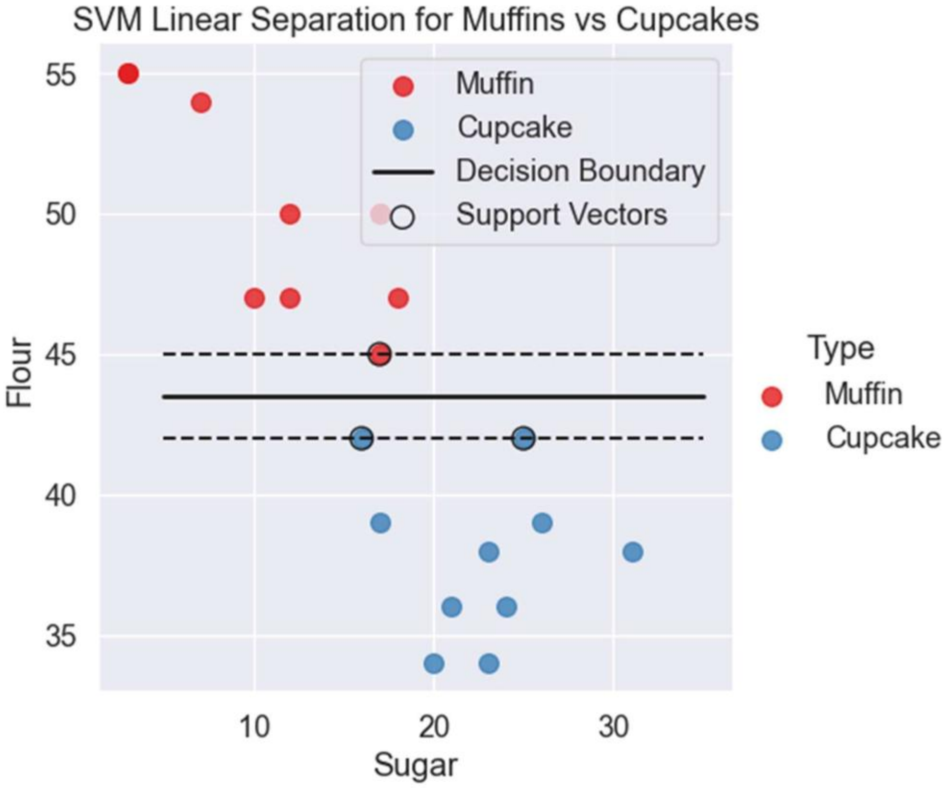
```
sns.lmplot(x='Sugar', y='Flour', data=recipes, hue='Type',
palette='Set1', fit_reg=False, scatter_kws={"s":70}) plt.title("Muffins
vs Cupcakes (Sugar vs Flour)")

plt.show()
# Split dataset x_train, x_test, y_train, y_test = train_test_split(
sugar_flour, type_label, test_size=0.2, random_state=42)

# Train model
model1 = svm.SVC(kernel='linear') model1.fit(x_train, y_train)

# Make predictions pred =
model1.predict(x_test)
print("Predicted Labels:", pred)

# Confusion Matrix print("\nConfusion
Matrix:") print(confusion_matrix(y_test,
pred))

# Classification Report print("\nClassification
Report:") print(classification_report(y_test,
pred, target_names=['Muffin', 'Cupcake']))
```

OUTPUT:

```
      Type    Flour   Milk    Sugar    Butter    Egg    Baking Powder   Vanilla   Salt
0  Muffin      55      28        3          7          5             2                    0
   0
1  Muffin      47      24       12          6          9            1                    0
   0
2  Muffin      47      23       18          6          4            1                    0
   0
3  Muffin      45      11       17         17         8            1                    0
   0
4  Muffin     50      25       12          6          5            2                    1

   0
```

Shape of dataset: (20, 9)


Muffins vs Cupcakes (Sugar vs Flour)
Flour
55
50
45
40
35
Sugar
5
10
15
20
25
30
Type
● Muffin
● Cupcake


SVM Linear Separation for Muffins vs Cupcakes
● Muffin
● Cupcake
Decision Boundary
○ Support Vectors
Flour
55
50
45
40
35
Sugar
10
20
30
Type
● Muffin
● Cupcake

```
Predicted Labels: [1 0 1 0]


Confusion Matrix:
[[2 0]
 [0 2]]

Classification Report:
                 precision   recall    f1-score   support


     Muin       1.00          1.00         1.00          2
    Cupcake    1.00          1.00         1.00         2
    accuracy                                   1.00
4    macro avg    1.00          1.00         1.00
4 weighted avg 1.00       1.00       1.00        4
```

RESULT:

Thus a python program to do face recognition using SVM classifier is written and the output is verified successfully.