

# 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)

# Load dataset
```

```
recipes =  
pd.read_csv('/content/recipes_muffins_cupcakes.csv')
```

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

```
# Show shape  
print("Shape of dataset:", recipes.shape)
```

## 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

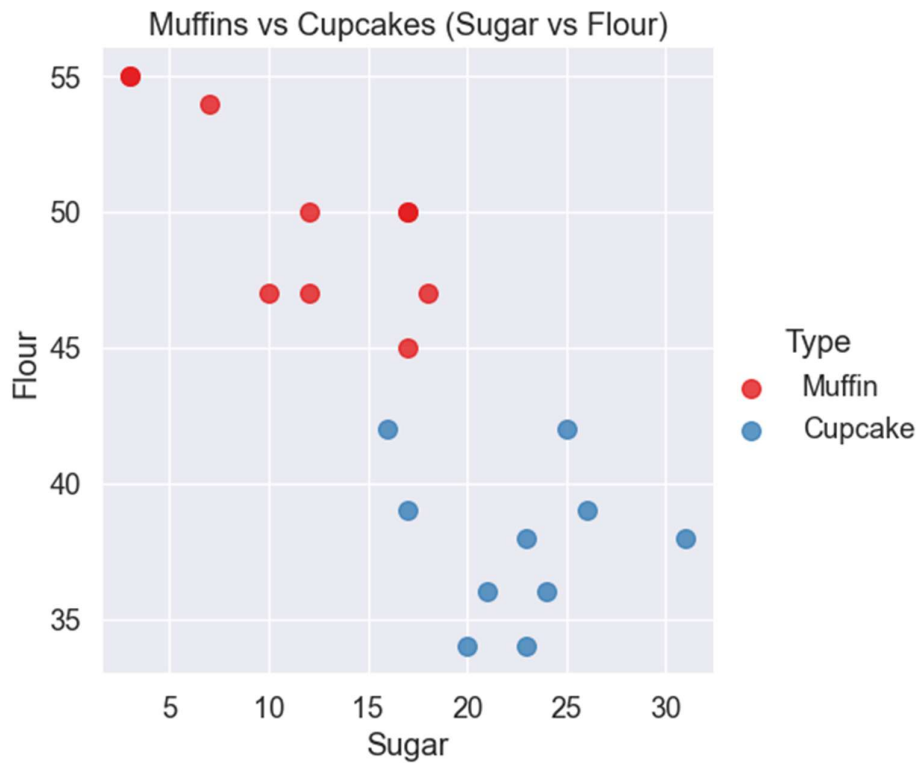
Shape of dataset: (20, 9)

## CODE:

```
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()`

## OUTPUT:



## CODE:

**# 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")

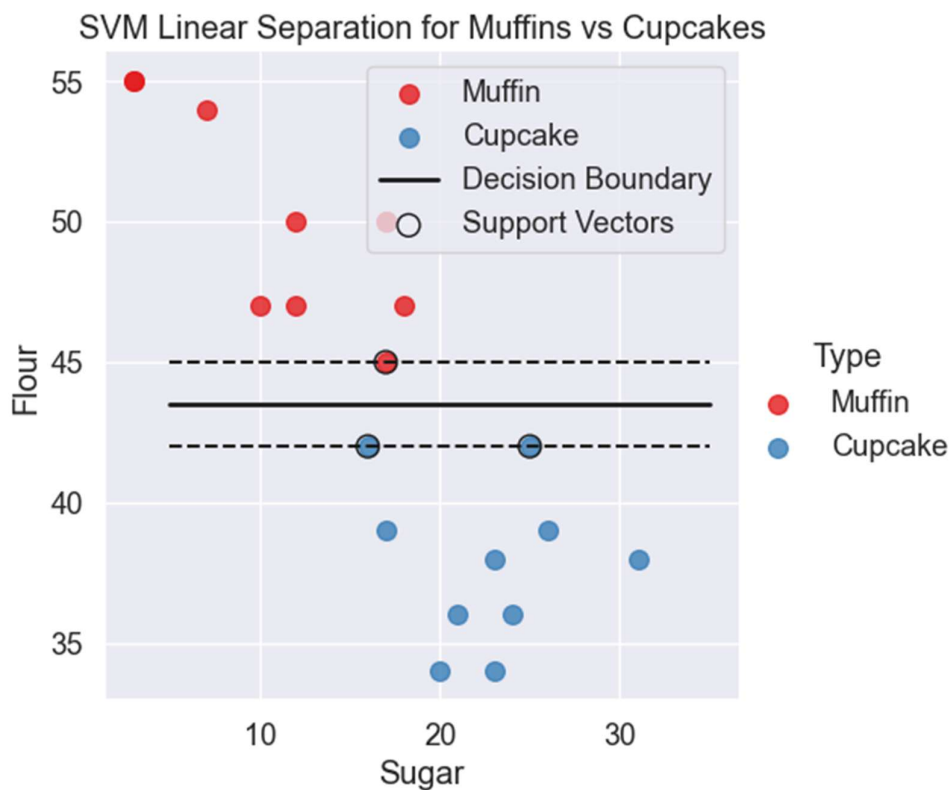
```

```
plt.title("SVM Linear Separation for Muffins vs Cupcakes")
```

```
plt.legend()
```

```
plt.show()
```

## OUTPUT:



## CODE:

```
# 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:**

**Predicted Labels: [1 0 1 0]**

**Confusion Matrix:**

**[[2 0]**

**[0 2]]**

### **Classification Report:**

	<b>precision</b>	<b>recall</b>	<b>f1-score</b>	<b>support</b>
<b>Muffin</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>2</b>
<b>Cupcake</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>2</b>
<b>accuracy</b>			<b>1.00</b>	<b>4</b>
<b>macro avg</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>4</b>
<b>weighted avg</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>4</b>

### **RESULT:**

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