2403A52O06

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```python
import pandas as pd
import numpy as np

from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score, f1_score, confusion_matrix
```

```python
# If your file is CSV
df = pd.read_csv("gender_classification_v7.csv")

df.head()
```

	long_hair	forehead_width_cm	forehead_height_cm	nose_wide	nose_long	lips_thin	dis
0	1	11.8	6.1	1	0	1	
1	0	14.0	5.4	0	0	1	
2	0	11.8	6.3	1	1	1	
3	0	14.4	6.1	0	1	1	
4	1	13.5	5.9	0	0	0	

Next steps: (Generate code with df) (New interactive sheet)

```python
df.shape, df.columns
```

```
((5001, 8),
 Index(['long_hair', 'forehead_width_cm', 'forehead_height_cm', 'nose_wide',
        'nose_long', 'lips_thin', 'distance_nose_to_lip_long', 'gender'],
       dtype='object'))
```

```python
X = df.iloc[:, :-1]   # All columns except last → Input
Y = df.iloc[:, -1]    # Last column → Output (label)
```

```python
X_train, X_test, Y_train, Y_test = train_test_split(
    X, Y, test_size=0.2, random_state=42
)
```

```python
svc_model = SVC(kernel='linear')

svc_model.fit(X_train, Y_train)
```

▾ SVC ⓘ ⑦

```
SVC(kernel='linear')
```

```
Y_pred = svc_model.predict(X_test)

Y_pred[:10]
```

```
array(['Male', 'Female', 'Female', 'Male', 'Male', 'Male', 'Male', 'Male',
       'Male', 'Female'], dtype=object)
```

```
accuracy = accuracy_score(Y_test, Y_pred)
print("Accuracy:", accuracy)
```

```
Accuracy: 0.9600399600399601
```

```
h_score = f1_score(Y_test, Y_pred, average='weighted')
print("H-Score (F1 Score):", h_score)
```

```
H-Score (F1 Score): 0.9600388433386421
```

```
cm = confusion_matrix(Y_test, Y_pred)
print("Confusion Matrix:\n", cm)
```

```
Confusion Matrix:
 [[484  18]
 [ 22 477]]
```

```python
import seaborn as sns
import matplotlib.pyplot as plt

plt.figure(figsize=(6, 4))

sns.heatmap(
    cm,
    annot=True,
    fmt="d",
    cmap="Blues",
    cbar=False
)

plt.xlabel("Predicted Label")
plt.ylabel("Actual Label")
plt.title("Confusion Matrix Heatmap")

plt.show()
```

Confusion Matrix Heatmap