

Upload the Dataset

```
from google.colab import files
```

Load the Dataset

```
import pandas as pd
```

```
df = pd.read_excel('e-commerce.csv.xlsx', sheet_name='E Comm')  
df.head()
```



	CustomerID	Churn	Tenure	PreferredLoginDevice	CityTier	WarehouseToHome	Preferred
0	50001	1	4.0	Mobile Phone	3	6.0	
1	50002	1	NaN	Phone	1	8.0	
2	50003	1	NaN	Phone	1	30.0	
3	50004	1	0.0	Phone	3	15.0	
4	50005	1	0.0	Phone	1	12.0	

Data Exploration

```
df.shape  
df.info()  
df.describe(include='all')
```



```
<class 'pandas.core.frame.DataFrame'>
```

```
RangeIndex: 5630 entries, 0 to 5629
```

```
Data columns (total 20 columns):
```

#	Column	Non-Null Count	Dtype
0	CustomerID	5630 non-null	int64
1	Churn	5630 non-null	int64
2	Tenure	5366 non-null	float64
3	PreferredLoginDevice	5630 non-null	object
4	CityTier	5630 non-null	int64
5	WarehouseToHome	5379 non-null	float64
6	PreferredPaymentMode	5630 non-null	object
7	Gender	5630 non-null	object
8	HourSpendOnApp	5375 non-null	float64
9	NumberOfDeviceRegistered	5630 non-null	int64
10	PreferredOrderCat	5630 non-null	object
11	SatisfactionScore	5630 non-null	int64
12	MaritalStatus	5630 non-null	object
13	NumberOfAddress	5630 non-null	int64
14	Complain	5630 non-null	int64
15	OrderAmountHikeFromlastYear	5365 non-null	float64
16	CouponUsed	5374 non-null	float64
17	OrderCount	5372 non-null	float64
18	DaySinceLastOrder	5323 non-null	float64
19	CashbackAmount	5630 non-null	float64

```
dtypes: float64(8), int64(7), object(5)
```

```
memory usage: 879.8+ KB
```

	CustomerID	Churn	Tenure	PreferredLoginDevice	CityTier	WarehouseToHome
count	5630.000000	5630.000000	5366.000000	5630	5630.000000	5379
unique	NaN	NaN	NaN	3	NaN	NaN
top	NaN	NaN	NaN	Mobile Phone	NaN	NaN
freq	NaN	NaN	NaN	2765	NaN	NaN
mean	52815.500000	0.168384	10.189899	NaN	1.654707	NaN
std	1625.385339	0.374240	8.557241	NaN	0.915389	NaN
min	50001.000000	0.000000	0.000000	NaN	1.000000	NaN
25%	51408.250000	0.000000	2.000000	NaN	1.000000	NaN
50%	52815.500000	0.000000	9.000000	NaN	1.000000	NaN
75%	54222.750000	0.000000	16.000000	NaN	3.000000	NaN
max	55630.000000	1.000000	61.000000	NaN	3.000000	1

Check for Missing Values and Duplicates

```
df.isnull().sum()  
df.duplicated().sum()
```

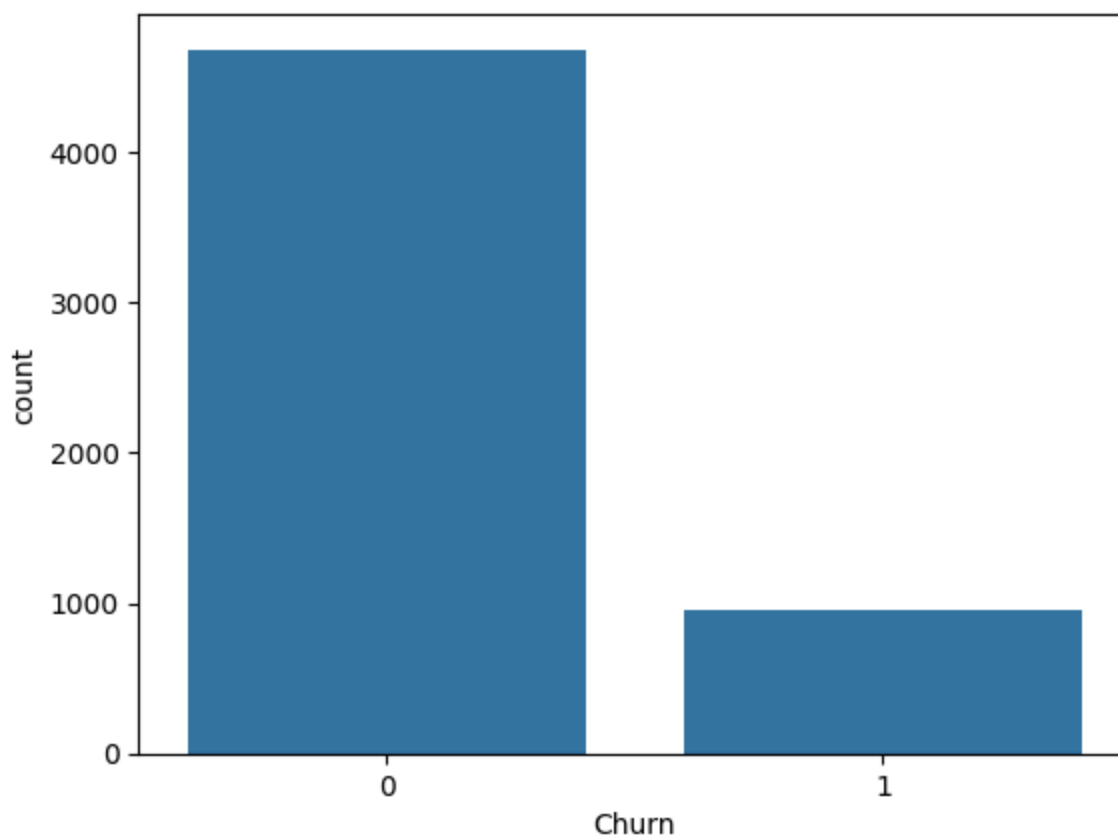
```
np.int64(0)
```

Visualize a Few Features

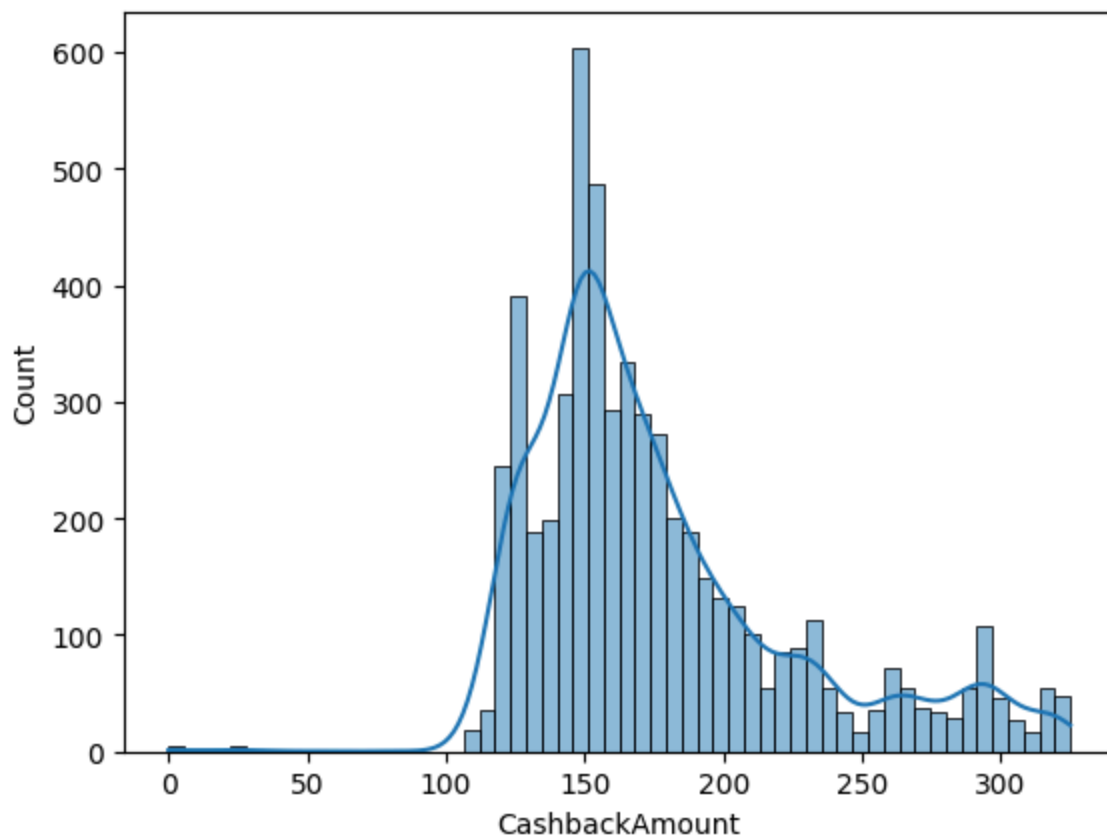
```
import seaborn as sns  
import matplotlib.pyplot as plt  
import pandas as pd #importing pandas  
  
# Assuming your data is in 'e-commerce.csv.xlsx' and sheet name is 'E Comm'  
df = pd.read_excel('e-commerce.csv.xlsx', sheet_name='E Comm') #defining the dataframe df as  
  
sns.countplot(data=df, x='Churn')  
plt.title('Churn Distribution')  
plt.show()  
  
sns.histplot(df['CashbackAmount'], kde=True)
```



Churn Distribution



<Axes: xlabel='CashbackAmount', ylabel='Count'>



```
import pandas as pd
import seaborn as sns
```

```
import matplotlib.pyplot as plt

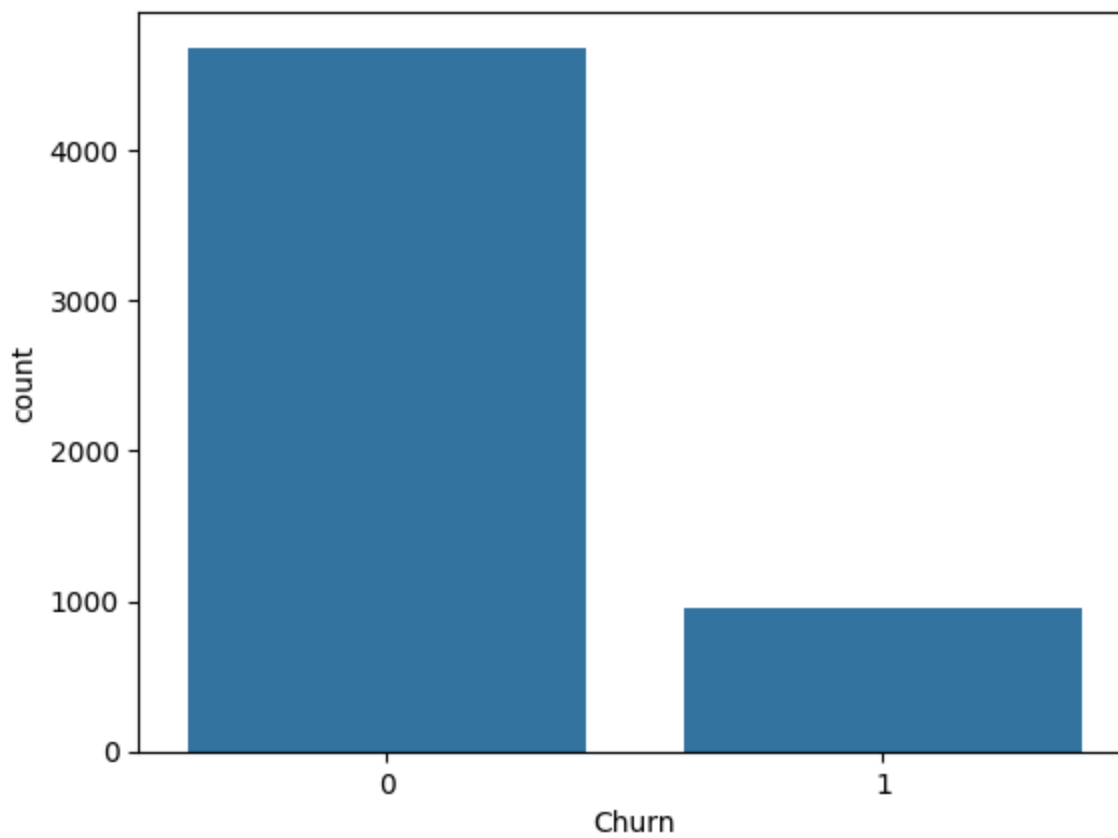
# Assuming your data is in 'e-commerce.csv.xlsx' and sheet name is 'E Comm'
df = pd.read_excel('e-commerce.csv.xlsx', sheet_name='E Comm')

sns.countplot(data=df, x='Churn')
plt.title('Churn Distribution')
plt.show()

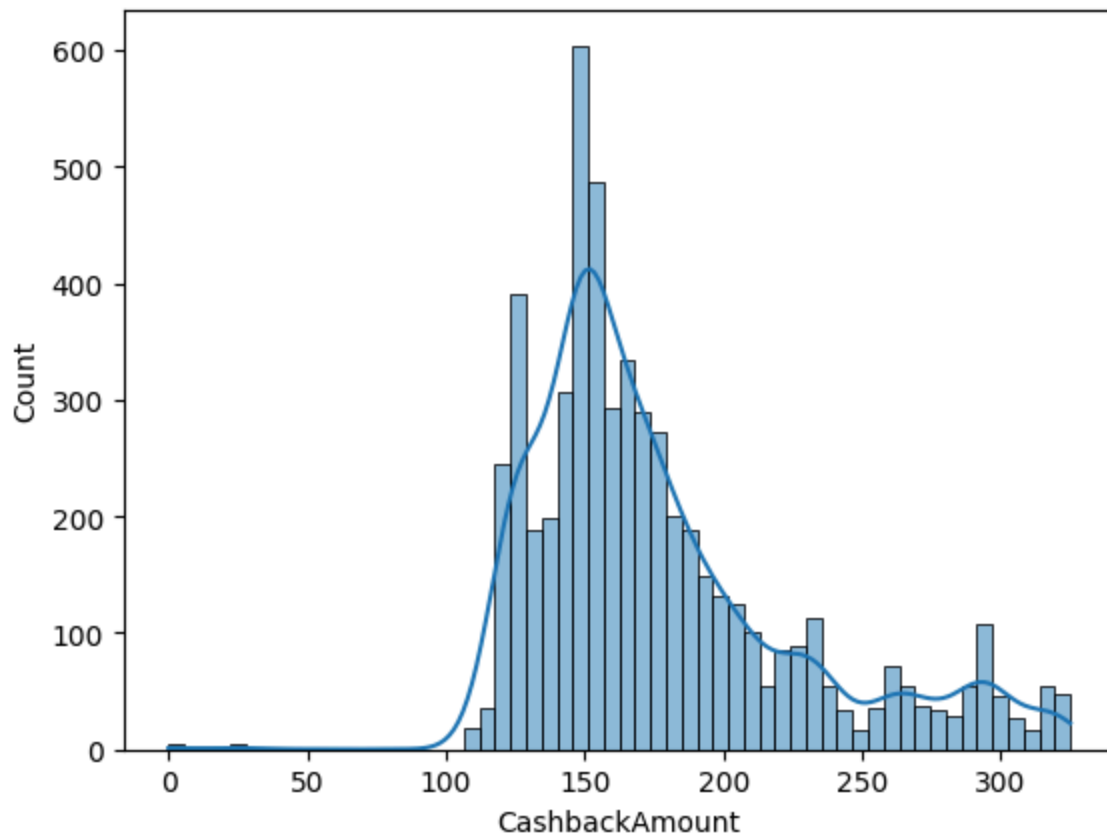
sns.histplot(df['CashbackAmount'], kde=True)
```



Churn Distribution



<Axes: xlabel='CashbackAmount', ylabel='Count'>



Identify Target and Features

```
target = 'Churn'
features = df.drop(columns=['Churn', 'CustomerID']).columns.tolist()
```

Convert Categorical Columns to Numerical

```
from sklearn.preprocessing import LabelEncoder

label_cols = ['Gender', 'MaritalStatus']
le = LabelEncoder()
for col in label_cols:
    df[col] = le.fit_transform(df[col])
```

One-Hot Encoding

```
df = pd.get_dummies(df, columns=['PreferredLoginDevice', 'PreferredPaymentMode', 'PreferredOr
```

Feature Scaling

```
from sklearn.preprocessing import StandardScaler

X = df.drop(columns=['Churn', 'CustomerID'])
y = df['Churn']

scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)
```

```
from sklearn.preprocessing import LabelEncoder, StandardScaler
```

```
# Assuming your data is in 'e-commerce.csv.xlsx' and sheet name is 'E Comm'
df = pd.read_excel('e-commerce.csv.xlsx', sheet_name='E Comm')
```

```
# Convert categorical columns to numerical using Label Encoding
label_cols = ['Gender', 'MaritalStatus']
le = LabelEncoder()
for col in label_cols:
    df[col] = le.fit_transform(df[col])
```

```
# Perform one-hot encoding for other categorical features
df = pd.get_dummies(df, columns=['PreferredLoginDevice', 'PreferredPaymentMode', 'PreferredOr
```

```
# Separate features and target variable
```

```
X = df.drop(columns=['Churn', 'CustomerID'])
y = df['Churn']
```

```
# Apply StandardScaler to the features
scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)
```

```
import pandas as pd
```

```
# Assuming your data is in 'e-commerce.csv.xlsx' and sheet name is 'E Comm'
df = pd.read_excel('e-commerce.csv.xlsx', sheet_name='E Comm')
df.head() # This will display the first few rows, confirming data loading
```

```
# ... (Rest of your code)
```



	CustomerID	Churn	Tenure	PreferredLoginDevice	CityTier	WarehouseToHome	Preferred
0	50001	1	4.0	Mobile Phone	3	6.0	
1	50002	1	NaN	Phone	1	8.0	
2	50003	1	NaN	Phone	1	30.0	
3	50004	1	0.0	Phone	3	15.0	
4	50005	1	0.0	Phone	1	12.0	

Train-Test Split

```
from sklearn.model_selection import train_test_split
```

```
X_train, X_test, y_train, y_test = train_test_split(X_scaled, y, test_size=0.2, random_state=42)
```

Model Building

```
from sklearn.ensemble import RandomForestClassifier
```

```
model = RandomForestClassifier()
model.fit(X_train, y_train)
```



▼ RandomForestClassifier ⓘ ?

RandomForestClassifier()

Evaluation

```
from sklearn.metrics import classification_report, confusion_matrix
```

```
y_pred = model.predict(X_test)
print(confusion_matrix(y_test, y_pred))
print(classification_report(y_test, y_pred))
```

```

[[940  1]
 [ 23 162]]

```

	precision	recall	f1-score	support
0	0.98	1.00	0.99	941
1	0.99	0.88	0.93	185
accuracy			0.98	1126
macro avg	0.98	0.94	0.96	1126
weighted avg	0.98	0.98	0.98	1126

Make Predictions from New Input

```
sample_input = X_test[0].reshape(1, -1)
model.predict(sample_input)
```

```
array([1])
```

Convert to DataFrame and Encode

```
def preprocess_input(input_dict):
    input_df = pd.DataFrame([input_dict])
    for col in label_cols:
        input_df[col] = le.transform(input_df[col])
    input_df = pd.get_dummies(input_df)
    input_df = input_df.reindex(columns=X.columns, fill_value=0)
    return scaler.transform(input_df)
```

Predict the Final Grade (Churn)

```
sample_dict = {
    'Gender': 'Male',
    'MaritalStatus': 'Single',
    'Tenure': 12,
```

```

'CityTier': 3,
'WarehouseToHome': 20,
'HourSpendOnApp': 2,
'NumberOfDeviceRegistered': 3,
'OrderAmountHikeFromlastYear': 10.0,
'CouponUsed': 2,
'OrderCount': 2,
'DaySinceLastOrder': 5,
'CashbackAmount': 150,
'PreferredLoginDevice': 'Mobile Phone',
'PreferredPaymentMode': 'Debit Card',
'PreferedOrderCat': 'Laptop & Accessory'
}

```

Deployment - Building an Interactive App

```

!pip install gradio
import gradio as gr

```

 Requirement already satisfied: gradio in /usr/local/lib/python3.11/dist-packages (5.29.0)
 Requirement already satisfied: aiofiles<25.0,>=22.0 in /usr/local/lib/python3.11/dist-packages (from gradio)
 Requirement already satisfied: anyio<5.0,>=3.0 in /usr/local/lib/python3.11/dist-packages (from gradio)
 Requirement already satisfied: fastapi<1.0,>=0.115.2 in /usr/local/lib/python3.11/dist-packages (from gradio)
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 Requirement already satisfied: gradio-client==1.10.0 in /usr/local/lib/python3.11/dist-packages (from gradio)
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 Requirement already satisfied: httpx>=0.24.1 in /usr/local/lib/python3.11/dist-packages (from gradio)
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 Requirement already satisfied: markupsafe<4.0,>=2.0 in /usr/local/lib/python3.11/dist-packages (from gradio)
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 Requirement already satisfied: fsspec in /usr/local/lib/python3.11/dist-packages (from gradio)

```

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Requirement already satisfied: certifi in /usr/local/lib/python3.11/dist-packages (from
Requirement already satisfied: httpcore==1.* in /usr/local/lib/python3.11/dist-packages
Requirement already satisfied: h11>=0.16 in /usr/local/lib/python3.11/dist-packages (fr
Requirement already satisfied: filelock in /usr/local/lib/python3.11/dist-packages (from
Requirement already satisfied: requests in /usr/local/lib/python3.11/dist-packages (from
Requirement already satisfied: tqdm>=4.42.1 in /usr/local/lib/python3.11/dist-packages (
Requirement already satisfied: python-dateutil>=2.8.2 in /usr/local/lib/python3.11/dist-
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.11/dist-packages (
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Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/python3.11/dist-
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Requirement already satisfied: click>=8.0.0 in /usr/local/lib/python3.11/dist-packages (
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Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.11/dist-packages (from
Requirement already satisfied: markdown-it-py>=2.2.0 in /usr/local/lib/python3.11/dist-p
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /usr/local/lib/python3.11/dist
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.11/dis
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-pack
Requirement already satisfied: mdurl~=0.1 in /usr/local/lib/python3.11/dist-packages (fr

```

Create a Prediction Function

```

def predict_churn(**kwargs):
    processed = preprocess_input(kwargs)
    prediction = model.predict(processed)[0]
    return "Churn" if prediction == 1 else "No Churn"

```

Create the Gradio Interface

```

https://ed9472689cde26aab8.gradio.live https://ed9472689cde26aab8.gradio.livevvv https://ec
import gradio as gr

inputs = [
    gr.Number(label="Tenure"),
    gr.Dropdown(['Male', 'Female'], label="Gender"),
    gr.Number(label="Hour Spend on App"),
    # Add more inputs as needed matching features
]

interface = gr.Interface(fn=predict_churn, inputs=inputs, outputs="text")
interface.launch()

```



```
Requirement already satisfied: gradio in /usr/local/lib/python3.11/dist-packages (5.29.0)
Requirement already satisfied: aiofiles<25.0,>=22.0 in /usr/local/lib/python3.11/dist-packages (5.29.0)
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Requirement already satisfied: fastapi<1.0,>=0.115.2 in /usr/local/lib/python3.11/dist-packages (5.29.0)
Requirement already satisfied: ffmpeg in /usr/local/lib/python3.11/dist-packages (from gradio) (4.9.2)
Requirement already satisfied: gradio-client==1.10.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (1.10.0)
Requirement already satisfied: groovy~=0.1 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.1.0)
Requirement already satisfied: httpx>=0.24.1 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.27.0)
Requirement already satisfied: huggingface-hub>=0.28.1 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.28.1)
Requirement already satisfied: jinja2<4.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (3.1.3)
Requirement already satisfied: markupsafe<4.0,>=2.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (2.1.5)
Requirement already satisfied: numpy<3.0,>=1.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (1.26.4)
Requirement already satisfied: orjson~=3.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (3.10.11)
Requirement already satisfied: packaging in /usr/local/lib/python3.11/dist-packages (from gradio) (24.1)
Requirement already satisfied: pandas<3.0,>=1.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (2.2.2)
Requirement already satisfied: pillow<12.0,>=8.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (10.4.0)
Requirement already satisfied: pydantic<2.12,>=2.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (2.11.10)
Requirement already satisfied: pydub in /usr/local/lib/python3.11/dist-packages (from gradio) (0.25.1)
Requirement already satisfied: python-multipart>=0.0.18 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.0.20)
Requirement already satisfied: pyyaml<7.0,>=5.0 in /usr/local/lib/python3.11/dist-packages (from gradio) (6.0.2)
Requirement already satisfied: ruff>=0.9.3 in /usr/local/lib/python3.11/dist-packages (from gradio) (0.11.10)
```