```
from google.colab import files
uploaded = files.upload()
```

Choose Files No file chosen Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable

```
import pandas as pd


df = pd.read_csv('movies.csv')


df.head()
```

	movieId	title	genres
0	1	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy
1	2	Jumanji (1995)	Adventure|Children|Fantasy
2	3	Grumpier Old Men (1995)	Comedy|Romance
3	4	Waiting to Exhale (1995)	Comedy|Drama|Romance
4	5	Father of the Bride Part II (1995)	Comedy

```
print("Shape:", df.shape)
```

```
Shape: (62423, 3)
```

```
print("Columns:", df.columns.tolist())
```

```
Columns: ['movieId', 'title', 'genres']
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 62423 entries, 0 to 62422
Data columns (total 3 columns):
 #   Column   Non-Null Count  Dtype 
---  ------   --------------  ----- 
 0   movieId  62423 non-null  int64 
 1   title    62423 non-null  object
 2   genres   62423 non-null  object
dtypes: int64(1), object(2)
memory usage: 1.4+ MB
```

```
df.describe()
```

	movieId
count	62423.000000
mean	122220.387646
std	63264.744844
min	1.000000
25%	82146.500000
50%	138022.000000
75%	173222.000000
max	209171.000000

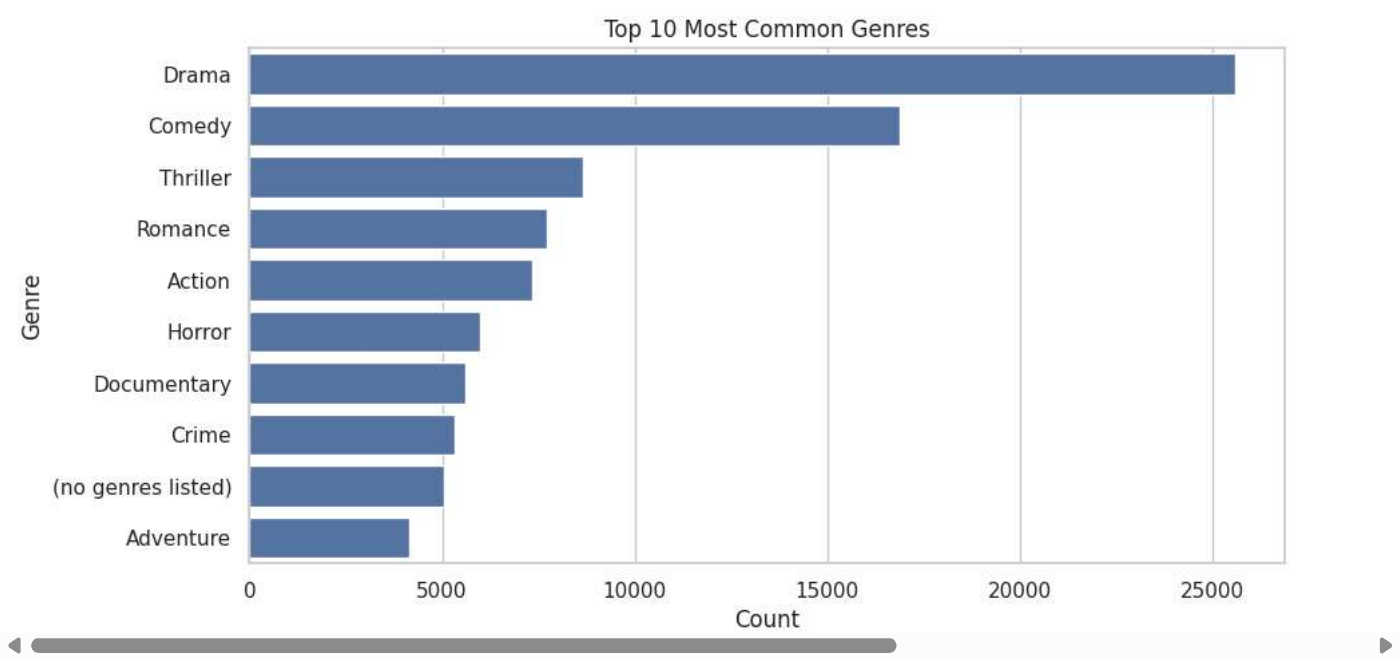
```
print("🔍 Missing Values:\n", df.isnull().sum())

# Check for duplicate rows
duplicate_count = df.duplicated().sum()
print(f"\n📌 Number of Duplicate Rows: {duplicate_count}")
```

```
🔍 Missing Values:
 movieId    0
title      0
```

```
genres     0
dtype: int64
```

```
📌 Number of Duplicate Rows: 0
```

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

# Set plot style
sns.set(style="whitegrid")

# 1. Most Common Genres (Assumes 'genres' is a pipe-separated string or similar)
if 'genres' in df.columns:
    from collections import Counter
    genre_counts = Counter()
    df['genres'].dropna().apply(lambda x: genre_counts.update(x.split('|') if '|' in x else x.split(',')))

    genres, counts = zip(*genre_counts.most_common(10))
    plt.figure(figsize=(10, 5))
    sns.barplot(x=list(counts), y=list(genres))
    plt.title("Top 10 Most Common Genres")
    plt.xlabel("Count")
    plt.ylabel("Genre")
    plt.show()

# 2. Movie Release Years (if 'release_date' column exists)
if 'release_date' in df.columns:
    df['release_year'] = pd.to_datetime(df['release_date'], errors='coerce').dt.year
    plt.figure(figsize=(12, 6))
    sns.histplot(df['release_year'].dropna(), bins=30, kde=False)
    plt.title("Number of Movies Released per Year")
    plt.xlabel("Release Year")
    plt.ylabel("Count")
    plt.show()

# 3. Distribution of Movie Ratings (if 'vote_average' or similar exists)
if 'vote_average' in df.columns:
    plt.figure(figsize=(8, 4))
    sns.histplot(df['vote_average'], bins=20, kde=True)
    plt.title("Distribution of Movie Ratings")
    plt.xlabel("Average Rating")
    plt.ylabel("Frequency")
    plt.show()

# 4. Distribution of Popularity (if 'popularity' column exists)
if 'popularity' in df.columns:
    plt.figure(figsize=(8, 4))
    sns.histplot(df['popularity'], bins=30, kde=True)
    plt.title("Distribution of Movie Popularity")
    plt.xlabel("Popularity Score")
    plt.ylabel("Frequency")
    plt.show()
```




```
print("🔎 Columns in Dataset:")
print(df.columns.tolist())
```

```
🔎 Columns in Dataset:
['movieId', 'title', 'genres']
```

```
features = ['genres', 'keywords', 'cast', 'director']

# Check if all selected features exist
available_features = [f for f in features if f in df.columns]
print("\n✅ Selected Features for Content-Based Filtering:")
print(available_features)
```

```
✅ Selected Features for Content-Based Filtering:
['genres']
```

```
import pandas as pd
from sklearn.preprocessing import LabelEncoder

# Sample DataFrame
df = pd.DataFrame({
    'Color': ['Red', 'Blue', 'Green', 'Red', 'Green'],
    'Size': ['S', 'M', 'L', 'S', 'M']
})

# Convert all categorical columns to numerical using LabelEncoder
label_encoders = {}
for column in df.select_dtypes(include='object').columns:
    le = LabelEncoder()
    df[column] = le.fit_transform(df[column])
    label_encoders[column] = le

print(df)
```

```
   Color  Size
0      2     2
1      0     1
2      1     0
3      2     2
4      1     1
```

```
df_one_hot = pd.get_dummies(df, columns=['Color', 'Size'])

df_one_hot
```

	Color_0	Color_1	Color_2	Size_0	Size_1	Size_2
0	False	False	True	False	False	True
1	True	False	False	False	True	False
2	False	True	False	True	False	False
3	False	False	True	False	False	True
4	False	True	False	False	True	False

```
from sklearn.preprocessing import StandardScaler, MinMaxScaler

# Sample DataFrame (using the one-hot encoded df for demonstration)
# Assuming df_one_hot is the result of the previous step
# If you want to scale numerical features directly from the original df,
# select those columns first.

# Example: Scaling the one-hot encoded features
# scaler = StandardScaler()
scaler = MinMaxScaler() # You can choose StandardScaler or MinMaxScaler

# Select numerical columns to scale.
# In the one-hot encoded df_one_hot, all columns are numerical after encoding.
# If you had other numerical features in your original df (like 'vote_average', 'popularity', 'runtime'),
# you would select those here.
columns_to_scale = df_one_hot.columns # Scaling all columns in the one-hot encoded df

df_scaled = df_one_hot.copy() # Create a copy to avoid modifying the original df_one_hot

df_scaled[columns_to_scale] = scaler.fit_transform(df_one_hot[columns_to_scale])

print("\n📊 Scaled DataFrame:")
print(df_scaled.head())
```

```
📊 Scaled DataFrame:
   Color_0  Color_1  Color_2  Size_0  Size_1  Size_2
0      0.0      0.0      1.0     0.0     0.0     1.0
1      1.0      0.0      0.0     0.0     1.0     0.0
2      0.0      1.0      0.0     1.0     0.0     0.0
3      0.0      0.0      1.0     0.0     0.0     1.0
4      0.0      1.0      0.0     0.0     1.0     0.0
```

```
from sklearn.model_selection import train_test_split

# Suppose you have features X and target y
# X = features (DataFrame or array)
# y = target (Series or array)

X_train, X_test, y_train, y_test = train_test_split(
    X, y,          # Data to split
    test_size=0.2, # 20% test, 80% train
    random_state=42 # Seed for reproducibility
)


import pandas as pd
from sklearn.model_selection import train_test_split

# Sample data
data = pd.DataFrame({
    'Feature1': [10, 20, 30, 40, 50],
    'Feature2': [5, 4, 3, 2, 1],
    'Target': [0, 1, 0, 1, 0]
})

# Features and target
X = data[['Feature1', 'Feature2']]
y = data['Target']

# Train-test split
X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.2, random_state=42
)
```

```
print("Train Features:\n", X_train)
print("Test Features:\n", X_test)
print("Train Labels:\n", y_train)
print("Test Labels:\n", y_test)
```

```
Train Features:
    Feature1  Feature2
4        50         1
2        30         3
0        10         5
3        40         2
Test Features:
    Feature1  Feature2
1        20         4
Train Labels:
 4    0
2    0
0    0
3    1
Name: Target, dtype: int64
Test Labels:
 1    1
Name: Target, dtype: int64
```

```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import LabelEncoder
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score

# 1. Load sample dataset
data = pd.DataFrame({
    'Color': ['Red', 'Blue', 'Green', 'Red', 'Green'],
    'Size': ['S', 'M', 'L', 'S', 'M'],
    'Target': [1, 0, 1, 0, 1]
})

# 2. Encode categorical features
label_encoders = {}
for col in data.select_dtypes(include='object').columns:
    le = LabelEncoder()
    data[col] = le.fit_transform(data[col])
    label_encoders[col] = le

# 3. Split features and target
X = data.drop('Target', axis=1)
y = data['Target']

# 4. Split train-test sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

# 5. Build and train model
model = LogisticRegression()
model.fit(X_train, y_train)

# 6. Make predictions and evaluate
y_pred = model.predict(X_test)
accuracy = accuracy_score(y_test, y_pred)

print("Accuracy:", accuracy)
```

```
Accuracy: 0.0
```

```
from sklearn.linear_model import LogisticRegression
model = LogisticRegression()



accuracy = accuracy_score(y_test, y_pred)
print(f"Accuracy: {accuracy:.4f}")
```

```
Accuracy: 0.0000
```

```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.preprocessing import LabelEncoder
```

```
# Sample training data
data = pd.DataFrame({
    'Color': ['Red', 'Blue', 'Green', 'Red', 'Green'],
    'Size': ['S', 'M', 'L', 'S', 'M'],
    'Target': [1, 0, 1, 0, 1]
})

# Encode categorical features
label_encoders = {}
for col in data.select_dtypes(include='object').columns:
    le = LabelEncoder()
    data[col] = le.fit_transform(data[col])
    label_encoders[col] = le

# Split into features and target
X = data.drop('Target', axis=1)
y = data['Target']

# Train-test split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

# Train the model
model = LogisticRegression()
model.fit(X_train, y_train)

# ✅ New input for prediction (as raw categorical values)
new_input = pd.DataFrame({
    'Color': ['Red'],
    'Size': ['M']
})

# Encode the new input using the same label encoders
for col in new_input.columns:
    le = label_encoders[col]
    new_input[col] = le.transform(new_input[col])

# Predict
prediction = model.predict(new_input)

print("Prediction:", prediction[0])
```

```
Prediction: 1
```

```
import pandas as pd
from sklearn.preprocessing import LabelEncoder

# --- Assume this was your training data ---
training_data = pd.DataFrame({
    'Color': ['Red', 'Blue', 'Green', 'Red', 'Green'],
    'Size': ['S', 'M', 'L', 'S', 'M'],
    'Target': [1, 0, 1, 0, 1]
})

# Encode categorical columns
label_encoders = {}
for col in training_data.select_dtypes(include='object').columns:
    le = LabelEncoder()
    training_data[col] = le.fit_transform(training_data[col])
    label_encoders[col] = le

# --- Now you have new input in raw form ---
new_data = {
    'Color': ['Green'],  # raw input
    'Size': ['L']
}

# Convert to DataFrame
new_df = pd.DataFrame(new_data)

# Encode new data using the same label encoders
for col in new_df.columns:
    if col in label_encoders:
        le = label_encoders[col]
        new_df[col] = le.transform(new_df[col])
```

```
print("Encoded new input:")
print(new_df)
```

```
Encoded new input:
   Color  Size
0      1     0
```

```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression

# Sample data (replace with your real dataset)
data = pd.DataFrame({
    'Homework': [90, 80, 70, 60, 50],
    'Quiz': [88, 76, 70, 65, 50],
    'Attendance': [95, 85, 80, 70, 60],
    'FinalGrade': [92, 82, 74, 68, 55]
})

# Features and target
X = data[['Homework', 'Quiz', 'Attendance']]
y = data['FinalGrade']

# Train-test split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

# Train a regression model
model = LinearRegression()
model.fit(X_train, y_train)

# --- 🔮 New input for prediction ---
new_input = pd.DataFrame({
    'Homework': [85],
    'Quiz': [80],
    'Attendance': [90]
})

# Predict the final grade
predicted_grade = model.predict(new_input)

print("Predicted Final Grade:", predicted_grade[0])
```

```
Predicted Final Grade: 85.15
```

```
!pip install gradio
```

```
Collecting semantic-version~=2.0 (from gradio)
```

```
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-packages (from requests->huggingface-hub>=0.28.1
```

```
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-packages (from requests->huggingface-hub>=0.28.1-
Requirement already satisfied: mdurl~=0.1 in /usr/local/lib/python3.11/dist-packages (from markdown-it-py>=2.2.0->rich>=10.11.0->type
Downloading gradio-5.29.1-py3-none-any.whl (54.1 MB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 54.1/54.1 MB 23.3 MB/s eta 0:00:00
Downloading gradio_client-1.10.1-py3-none-any.whl (323 kB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 323.1/323.1 kB 23.0 MB/s eta 0:00:00
Downloading aiofiles-24.1.0-py3-none-any.whl (15 kB)
Downloading fastapi-0.115.12-py3-none-any.whl (95 kB)
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Downloading groovy-0.1.2-py3-none-any.whl (14 kB)
Downloading python_multipart-0.0.20-py3-none-any.whl (24 kB)
Downloading ruff-0.11.10-py3-none-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (11.6 MB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 11.6/11.6 MB 119.3 MB/s eta 0:00:00
Downloading safehttpx-0.1.6-py3-none-any.whl (8.7 kB)
Downloading semantic_version-2.10.0-py2.py3-none-any.whl (15 kB)
Downloading starlette-0.46.2-py3-none-any.whl (72 kB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 72.0/72.0 kB 6.8 MB/s eta 0:00:00
Downloading tomlkit-0.13.2-py3-none-any.whl (37 kB)
Downloading uvicorn-0.34.2-py3-none-any.whl (62 kB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 62.5/62.5 kB 5.2 MB/s eta 0:00:00
Downloading ffmpy-0.5.0-py3-none-any.whl (6.0 kB)
Downloading pydub-0.25.1-py2.py3-none-any.whl (32 kB)
Installing collected packages: pydub, uvicorn, tomlkit, semantic-version, ruff, python-multipart, groovy, ffmpy, aiofiles, starlette,
Successfully installed aiofiles-24.1.0 fastapi-0.115.12 ffmpy-0.5.0 gradio-5.29.1 gradio-client-1.10.1 groovy-0.1.2 pydub-0.25.1 pyth
```

```
import gradio as gr
import pandas as pd
from sklearn.linear_model import LinearRegression
from sklearn.preprocessing import StandardScaler

# Sample data
data = pd.DataFrame({
    'Homework': [90, 80, 70, 60, 50],
    'Quiz': [88, 76, 70, 65, 50],
    'Attendance': [95, 85, 80, 70, 60],
    'FinalGrade': [92, 82, 74, 68, 55]
})

# Train model
X = data[['Homework', 'Quiz', 'Attendance']]
y = data['FinalGrade']
model = LinearRegression().fit(X, y)

# Preprocessing and Prediction
def preprocess_and_predict(homework, quiz, attendance):
    scaler = StandardScaler().fit(X)  # Fit scaler on the training data
    new_input = pd.DataFrame([[homework, quiz, attendance]], columns=['Homework', 'Quiz', 'Attendance'])
    new_input_scaled = scaler.transform(new_input)  # Transform the new input
    return model.predict(new_input_scaled)[0]

# Gradio interface
inputs = [
    gr.Slider(0, 100, 85, label="Homework"),
    gr.Slider(0, 100, 80, label="Quiz"),
    gr.Slider(0, 100, 90, label="Attendance")
]

outputs = gr.Textbox(label="Predicted Final Grade")

# Launch Gradio app
gr.Interface(fn=preprocess_and_predict, inputs=inputs, outputs=outputs, live=True).launch()
```

```
It looks like you are running Gradio on a hosted a Jupyter notebook. For the Gradio app to work, sharing must be enabled. Automatically

Colab notebook detected. To show errors in colab notebook, set debug=True in launch()
* Running on public URL: https://c99d58b94a6d4ca984.gradio.live

This share link expires in 1 week. For free permanent hosting and GPU upgrades, run `gradio deploy` from the terminal in the working dir
```

No interface is running right now