Upload the dataset

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

```
Choose Files netflix_titles.csv
• netflix_titles.csv(text/csv) - 3399671 bytes, last modified: 5/8/2025 - 100% done
Saving netflix_titles.csv to netflix_titles.csv
```

Load the Dataset

```
import pandas as pd

df = pd.read_csv('/content/netflix_titles.csv')
df.head()
```

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_ir
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	PG-13	90 min	Documentaries
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	Internationa TV Shows, TV Dramas, TV Mysteries
2	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	NaN	September 24, 2021	2021	TV-MA	1 Season	Crime TV Shows Internationa TV Shows, TV Act..
3	s4	TV Show	Jailbirds New Orleans	NaN	NaN	NaN	September 24, 2021	2021	TV-MA	1 Season	Docuseries Reality TV
4	s5	TV Show	Kota Factory	NaN	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	2021	TV-MA	2 Seasons	Internationa TV Shows Romantic TV Shows, TV ..

Next steps: Generate code with df | View recommended plots | New interactive sheet

Data Exploration

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8807 entries, 0 to 8806
Data columns (total 12 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   show_id       8807 non-null   object
 1   type          8807 non-null   object
 2   title         8807 non-null   object
 3   director      6173 non-null   object
 4   cast          7982 non-null   object
 5   country       7976 non-null   object
 6   date_added    8797 non-null   object
 7   release_year  8807 non-null   int64
 8   rating        8803 non-null   object
 9   duration      8804 non-null   object
 10  listed_in     8807 non-null   object
 11  description   8807 non-null   object
dtypes: int64(1), object(11)
memory usage: 825.8+ KB
```

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed
count	8807	8807	8807	6173	7982	7976	8797	8807.000000	8803	8804	8
unique	8807	2	8807	4528	7692	748	1767	NaN	17	220	
top	s8807	Movie	Zubaan	Rajiv Chilaka	David Attenborough	United States	January 1, 2020	NaN	TV-MA	1 Season	Dran Internatic Mov
freq	1	6131	1	19	19	2818	109	NaN	3207	1793	
mean	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2014.180198	NaN	NaN	N
std	NaN	NaN	NaN	NaN	NaN	NaN	NaN	8.819312	NaN	NaN	N
min	NaN	NaN	NaN	NaN	NaN	NaN	NaN	1925.000000	NaN	NaN	N
25%	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2013.000000	NaN	NaN	N
50%	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2017.000000	NaN	NaN	N
75%	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2019.000000	NaN	NaN	N
max	NaN	NaN	NaN	NaN	NaN	NaN	NaN	2021.000000	NaN	NaN	N

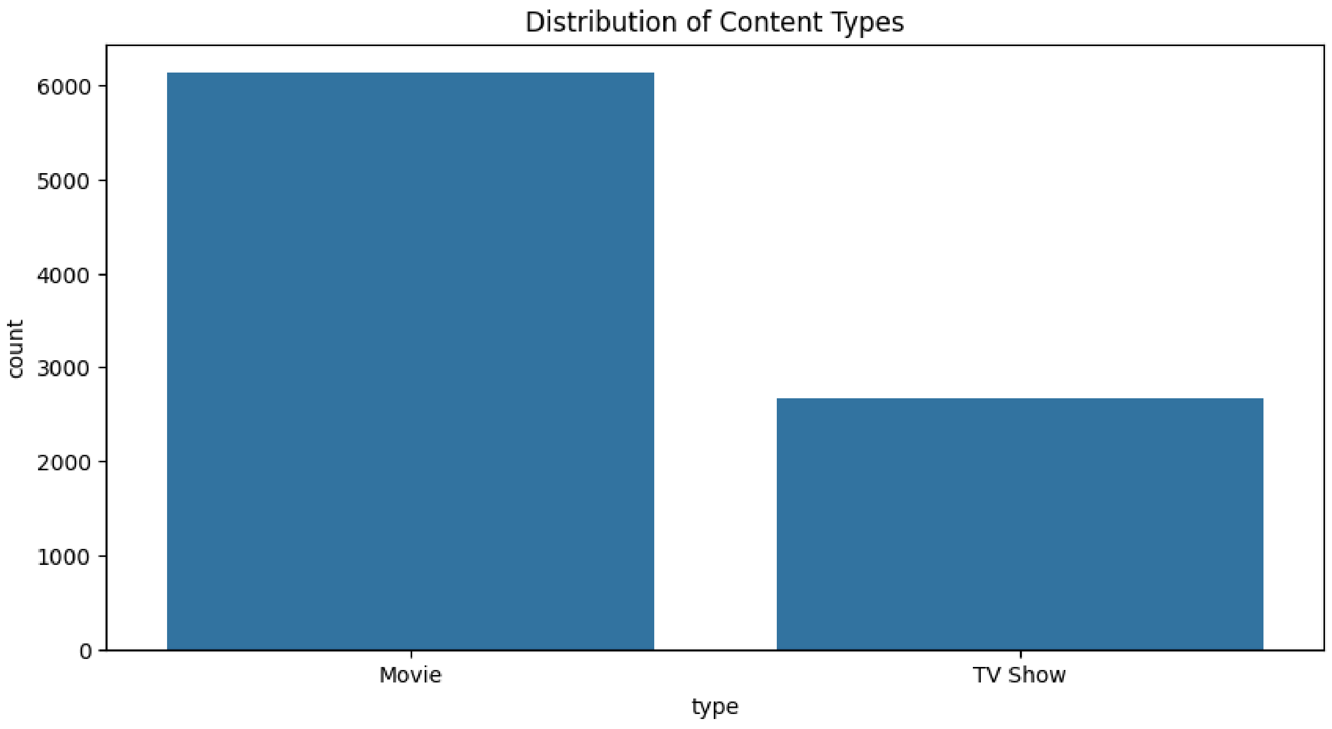
Check for Missing Values and Duplicates

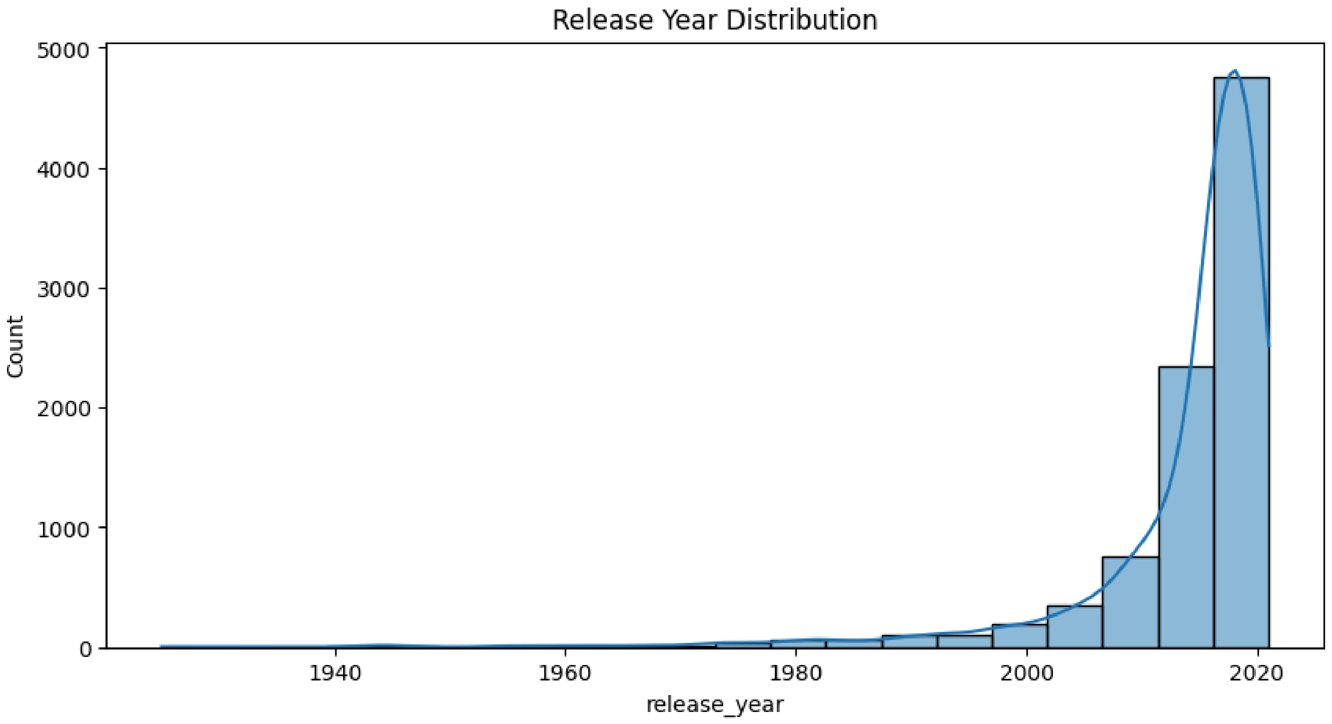
```
print(df.isnull().sum())
print("\nDuplicate Rows:", df.duplicated().sum())
```

```
show_id            0
type               0
title              0
director        2634
cast             825
country          831
date_added        10
release_year       0
rating             4
duration           3
listed_in          0
description        0
dtype: int64

Duplicate Rows: 0
```

Visualize a Few Features

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

plt.figure(figsize=(10,5))
sns.countplot(data=df, x='type')
plt.title("Distribution of Content Types")
plt.show()

plt.figure(figsize=(10,5))
sns.histplot(df['release_year'], bins=20, kde=True)
plt.title("Release Year Distribution")
plt.show()
```





Identify Target and Features

```
# This dataset doesn't have a traditional 'target' column.
# For example, we could try to predict the 'type' (Movie/TV Show) based on other features.
target = 'type'
features = df.drop(columns=['type', 'show_id', 'title', 'description'])
```

Convert Categorical Columns to Numerical

```
df['date_added'] = pd.to_datetime(df['date_added'], format='mixed', errors='coerce')
df['year_added'] = df['date_added'].dt.year
df['month_added'] = df['date_added'].dt.month
df = df.drop(columns=['date_added'])
```

One-Hot Encoding

```
df_encoded = pd.get_dummies(df, columns=['rating', 'country', 'listed_in'], drop_first=True)
```

Feature Scaling

```
from sklearn.preprocessing import StandardScaler

# Step 1: Rename columns
df_encoded.rename(columns={
    'Year Added': 'year_added',
    'Month Added': 'month_added'
}, inplace=True)

# Step 2: Auto-detect numerical columns
numerical_cols = df_encoded.select_dtypes(include='number').columns

# Step 3: Scale numerical columns
scaler = StandardScaler()
df_encoded[numerical_cols] = scaler.fit_transform(df_encoded[numerical_cols])
```

Train-Test Split

```
from sklearn.model_selection import train_test_split

X = df_encoded.drop(columns=['type'])
y = df['type']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

Model Building

```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier

# Load your dataset
df = pd.read_csv('/content/netflix_titles.csv')  # Adjust path as needed

# Save target separately
target = df['type']

# Drop unnecessary columns
df = df.drop(columns=['show_id', 'title', 'description', 'cast', 'director', 'type'], errors='ignore')

# Convert date_added
df['date_added'] = pd.to_datetime(df['date_added'], format='mixed', errors='coerce')
df['year_added'] = df['date_added'].dt.year
df['month_added'] = df['date_added'].dt.month
df = df.drop(columns=['date_added'])

# Drop rows with missing values in critical columns
df = df.dropna(subset=['rating', 'country', 'release_year'])
```

```
# Encode categorical features
df_encoded = pd.get_dummies(df, drop_first=True)

# Align target with the filtered DataFrame
target = target.loc[df_encoded.index].astype('category').cat.codes

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

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

```
▾ RandomForestClassifier
RandomForestClassifier()
```

Evaluation

```
from sklearn.metrics import classification_report, accuracy_score

y_pred = model.predict(X_test)
print(classification_report(y_test, y_pred))
print("Accuracy:", accuracy_score(y_test, y_pred))
```

```
              precision    recall  f1-score   support

           0       0.98      0.99      0.98      1150
           1       0.96      0.95      0.96       445

    accuracy                           0.98      1595
   macro avg       0.97      0.97      0.97      1595
weighted avg       0.98      0.98      0.98      1595

Accuracy: 0.9755485893416928
```

Make Predictions from New Input

```
sample = X_test.iloc[0:1]
prediction = model.predict(sample)
print("Predicted Type:", prediction[0])
```

```
Predicted Type: 0
```

Convert to DataFrame and Encode

```
print(df_encoded.columns)
numerical_cols = df_encoded.select_dtypes(include=['number']).columns.tolist()
from sklearn.preprocessing import StandardScaler
import joblib

# Automatically detect numerical columns
numerical_cols = df_encoded.select_dtypes(include=['number']).columns.tolist()

# Fit and transform
scaler = StandardScaler()
scaler.fit(df_encoded[numerical_cols])
```

```
new_df[numerical_cols] = scaler.transform(new_df[numerical_cols])

# Save and load
joblib.dump(model, 'model.pkl')
joblib.dump(scaler, 'scaler.pkl')

model = joblib.load('model.pkl')
scaler = joblib.load('scaler.pkl')
```

```
Index(['release_year', 'year_added', 'month_added', 'country_, South Korea',
       'country_Argentina',
       'country_Argentina, Brazil, France, Poland, Germany, Denmark',
       'country_Argentina, Chile', 'country_Argentina, Chile, Peru',
       'country_Argentina, France',
       'country_Argentina, France, United States, Germany, Qatar',
       ...
       'listed_in_TV Dramas, TV Sci-Fi & Fantasy, Teen TV Shows',
       'listed_in_TV Dramas, TV Thrillers',
       'listed_in_TV Dramas, Teen TV Shows',
       'listed_in_TV Horror, TV Mysteries, TV Sci-Fi & Fantasy',
       'listed_in_TV Horror, TV Mysteries, TV Thrillers',
       'listed_in_TV Horror, TV Mysteries, Teen TV Shows',
       'listed_in_TV Horror, Teen TV Shows',
       'listed_in_TV Sci-Fi & Fantasy, TV Thrillers', 'listed_in_TV Shows',
       'listed_in_Thrillers'],
      dtype='object', length=1474)
```

Predict the Final Grade (assuming 'type')

```
feature_columns = df_encoded.columns.tolist()

# Save for later use
joblib.dump(feature_columns, 'feature_columns.pkl')
# Load the feature columns
feature_columns = joblib.load('feature_columns.pkl')

# Then align the new input
new_df_encoded = new_df_encoded.reindex(columns=feature_columns, fill_value=0)
import pandas as pd
import joblib

# Load the feature columns
feature_columns = joblib.load('feature_columns.pkl')

# Your new input
new_data = {
    'country': ['India'],
    'rating': ['TV-MA'],
    'release_year': [2021],
    'duration': ['1 Season'],
    'year_added': [2022],
    'month_added': [7],
    'listed_in': ['Dramas, International TV Shows']
}
new_df = pd.DataFrame(new_data)

# One-hot encode
new_df_encoded = pd.get_dummies(new_df, drop_first=True)

# Align with training columns
new_df_encoded = new_df_encoded.reindex(columns=feature_columns, fill_value=0)
```

Double-click (or enter) to edit

Deployment - Building an Interactive App python Copy Edit

```
!pip install gradio
import gradio as gr
```

```
Collecting semantic-version~=2.0 (from gradio)
  Downloading semantic_version-2.10.0-py2.py3-none-any.whl.metadata (9.7 kB)
Collecting starlette<1.0,>=0.40.0 (from gradio)
  Downloading starlette-0.46.2-py3-none-any.whl.metadata (6.2 kB)
Collecting tomlkit<0.14.0,>=0.12.0 (from gradio)
  Downloading tomlkit-0.13.2-py3-none-any.whl.metadata (2.7 kB)
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Requirement already satisfied: websockets<16.0,>=10.0 in /usr/local/lib/python3.11/dist-packages (from gradio-cl
Requirement already satisfied: idna>=2.8 in /usr/local/lib/python3.11/dist-packages (from anyio<5.0,>=3.0->gradi
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Requirement already satisfied: typing-inspection>=0.4.0 in /usr/local/lib/python3.11/dist-packages (from pydanti
Requirement already satisfied: click>=8.0.0 in /usr/local/lib/python3.11/dist-packages (from typer<1.0,>=0.12->g
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Requirement already satisfied: rich>=10.11.0 in /usr/local/lib/python3.11/dist-packages (from typer<1.0,>=0.12->
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Requirement already satisfied: markdown-it-py>=2.2.0 in /usr/local/lib/python3.11/dist-packages (from rich>=10.1
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /usr/local/lib/python3.11/dist-packages (from rich>=10
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.11/dist-packages (from request
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-packages (from requests->hug
Requirement already satisfied: mdurl~=0.1 in /usr/local/lib/python3.11/dist-packages (from markdown-it-py>=2.2.0
Downloading gradio-5.29.0-py3-none-any.whl (54.1 MB)
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Downloading fastapi-0.115.12-py3-none-any.whl (95 kB)
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Downloading python_multipart-0.0.20-py3-none-any.whl (24 kB)
Downloading ruff-0.11.9-py3-none-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (11.5 MB)
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Downloading semantic_version-2.10.0-py2.py3-none-any.whl (15 kB)
Downloading starlette-0.46.2-py3-none-any.whl (72 kB)
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Downloading uvicorn-0.34.2-py3-none-any.whl (62 kB)
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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,
Successfully installed aiofiles-24.1.0 fastapi-0.115.12 ffmpy-0.5.0 gradio-5.29.0 gradio-client-1.10.0 groovy-0.
```

Create a Prediction Function

```
def predict_type(release_year, year_added, month_added):
    input_data = pd.DataFrame([[release_year, year_added, month_added]],
                              columns=['release_year', 'year_added', 'month_added'])
    input_data[numerical_cols] = scaler.transform(input_data[numerical_cols])
    return model.predict(input_data)[0]
```

Create the Gradio Interface

```
import gradio as gr
import pandas as pd

# Save the feature columns after training
feature_columns = df_encoded.columns

# Define the prediction function
def predict_netflix_type(country, rating, release_year, duration, year_added, month_added, listed_in):
    # Create a new DataFrame for input
    new_input = pd.DataFrame({
        'country': [country],
        'rating': [rating],
        'release_year': [release_year],
        'duration': [duration],
        'year_added': [year_added],
        'month_added': [month_added],
        'listed_in': [listed_in]
    })

    # Encode the input similar to training
    new_encoded = pd.get_dummies(new_input, drop_first=True)

    # Reindex to match training features
    new_encoded = new_encoded.reindex(columns=feature_columns, fill_value=0)

    # Predict
    prediction = model.predict(new_encoded)[0]
    return "TV Show" if prediction == 1 else "Movie"

# Create the Gradio interface
interface = gr.Interface(
    fn=predict_netflix_type,
    inputs=[
        gr.Textbox(label="Country"),
        gr.Textbox(label="Rating (e.g. TV-MA)"),
        gr.Number(label="Release Year"),
        gr.Textbox(label="Duration (e.g. 1 Season or 90 min)"),
        gr.Number(label="Year Added"),
        gr.Number(label="Month Added"),
        gr.Textbox(label="Genres (Listed In)")
    ],
    outputs="text",
    title="Netflix Content Type Predictor",
    description="Predict whether the content is a Movie or TV Show based on input features."
)

interface.launch()
```

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

Colab notebook detected. To show errors in colab notebook, set debug=True in launch()
* Running on public URL: https://8f4561ebdd82999b51.gradio.live
```