

Web App: A movie recommender application designed using Streamlit.

Project Description

This project involves building a simple web app using streamlit which helps in providing multiple movie recommendations to the users after they have watched a particular movie. This project can be said to be on an intermediate level and has really helped us to gain more exposure towards the domain of creating applications and unique aspects of programming involved in the same.

Author

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Collaborators

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Project Language

Python

Difficulty

Intermediate

Duration

35 hours.

Prerequisites

Streamlit

Github link for the application

<https://github.com/Zenitsu11/Movie-Recommender>

Overview

Objective

The project focusses on building an application which will make movie recommendations hassle-free and user friendly depending on the user's last watched movies. This application analyses the recent movie watched by the user and thereby give suggestions based on cosine similarity.

Project Context

Movie recommendations are a unique concept and are used in various streaming platforms in day to day lives. Recommendations are based on the frequently watched genres or the user's preferences towards certain themes.

Recommendations can be based not just on movies but on songs, TV shows, web series, etc. However, certain applications are not adept in providing suitable and appropriate recommendations.

When it comes to streaming services, no system provides accurate and appropriate recommendations as that of Netflix. Amazon Prime Video and Disney+ Hotstar provide a large variety of viewing content but lose out to Netflix when it comes to providing recommendations.

Spotify, YouTube, Netflix are some applications which provide suitable recommendations. This project provides a user friendly interface and provides appropriate recommendations to the users based on their last watched movie.

It does have certain shortcomings such as the range of recommendations are selectively related just to movies and nothing more. Also, the UI is minimalistic and can have a more graphic outlook.

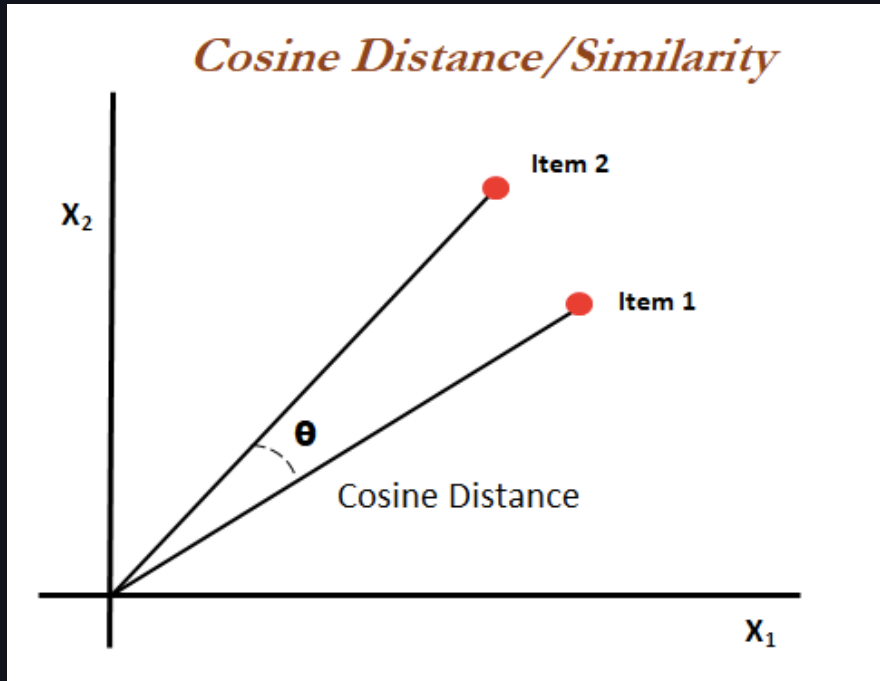
The application's interface and a walkthrough about it's usage can be accessed using the following link:

<https://drive.google.com/file/d/1gj8K3gTEUb0l2sIV537Qr-FL28qEuEal/view?usp=sharing>

Now we can discuss the various steps involved in the running of this application and the logic of cosine similarity which forms the basic foundation for the execution of this app.

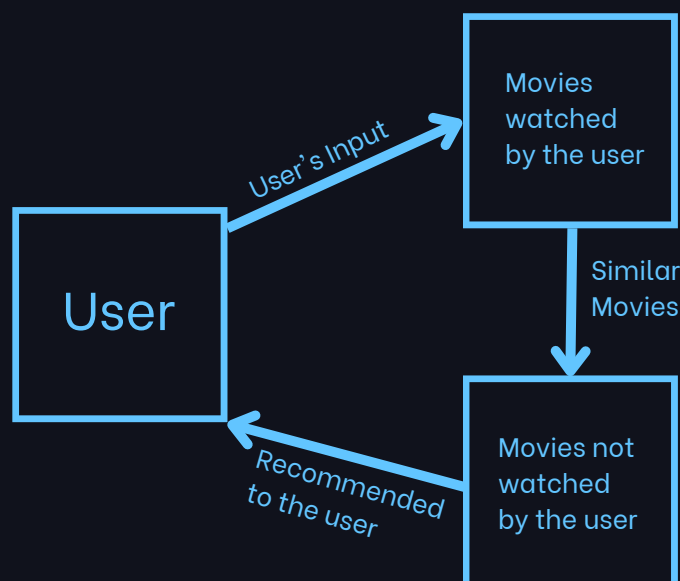
What is Cosine Similarity?

Cosine similarity is a metric used to measure how similar the documents are irrespective of their size. Mathematically, it measures the cosine of the angle between two vectors projected in a multi-dimensional space. The cosine similarity is advantageous because even if the two similar documents are far apart by the Euclidean distance (due to the size of the document), chances are they may still be oriented closer together. The smaller the angle, higher the cosine similarity.



What does this program do?

In simple terms, it provides movie recommendations to the user based on his recently watched movies.



Functioning of the program

Content Based Filtering – They suggest similar items based on a particular item. This system uses item metadata, such as genre, director, description, actors, etc. for movies, to make these recommendations. The general idea behind these recommender systems is that if a person liked a particular item, he or she will also like an item that is similar to it.

How to get the API key for images?

Create an account in <https://www.themoviedb.org/>, click on the API link from the left hand sidebar in your account settings and fill all the details to apply for API key. If you are asked for the website URL, just give “NA“ if you don’t have one. You will see the API key in your API sidebar once your request is approved.

```
4
5 def fetch_poster(movie_id):
6     url = "https://api.themoviedb.org/3/movie/{}?api_key=8265bd1679663a7ea12ac168da84d2e8&language=en-US".format(movie_id)
7     data = requests.get(url)
8     data = data.json()
9     poster_path = data['poster_path']
10    full_path = "https://image.tmdb.org/t/p/w500/" + poster_path
11    return full_path
12
```

Similarity Score

How does it decide which item is most similar to the item user likes? Here we use the similarity scores.

It is a numerical value ranges between zero to one which helps to determine how much two items are similar to each other on a scale of zero to one. This similarity score is obtained measuring the similarity between the text details of both of the items. So, similarity score is the measure of similarity between given text details of two items. This can be done by cosine-similarity.

```
In [32]: from sklearn.metrics.pairwise import cosine_similarity

In [33]: similarity = cosine_similarity(vector)

In [34]: sorted(list(enumerate(similarity[1])),reverse=True,key=lambda x:x[1])[1:6]

Out[34]: [(12, 0.4342995181076895),
          (199, 0.269659685815003),
          (17, 0.26940795304016235),
          (3572, 0.21213203435596426),
          (187, 0.20623947784607635)]

In [35]: similarity

Out[35]: array([[1.          , 0.08964215, 0.06071767, ..., 0.02519763, 0.0277885 ,
                0.          ],
               [0.08964215, 1.          , 0.06350006, ..., 0.02635231, 0.          ,
                0.          ],
               [0.06071767, 0.06350006, 1.          , ..., 0.02677398, 0.          ,
                0.          ],
               ...,
               [0.02519763, 0.02635231, 0.02677398, ..., 1.          , 0.07352146,
                0.04774099],
               [0.0277885 , 0.          , 0.          , ..., 0.07352146, 1.          ,
                0.05264981],
               [0.          , 0.          , 0.          , ..., 0.04774099, 0.05264981,
                1.          ]])
```

Directories and Source Codes required



Source Code for the Web Application

```
1 import pickle
2 import streamlit as st
3 import requests
4
5 def fetch_poster(movie_id):
6     url = "https://api.themoviedb.org/3/movie/{}?api_key=8265bd1679663a7ea12ac168da84d2e8&language=en-US".format(movie_id)
7     data = requests.get(url)
8     data = data.json()
9     poster_path = data['poster_path']
10    full_path = "https://image.tmdb.org/t/p/w500/" + poster_path
11    return full_path
12
13 def recommender(movie):
14    index = movies[movies['title'] == movie].index[0]
15    distances = sorted(list(enumerate(similarity[index])), reverse=True, key=lambda x: x[1])
16    recommended_movie_names = []
17    recommended_movie_posters = []
18    for i in distances[1:6]:
19        # fetch the movie poster
20        movie_id = movies.iloc[i[0]].movie_id
21        recommended_movie_posters.append(fetch_poster(movie_id))
22        recommended_movie_names.append(movies.iloc[i[0]].title)
23
24    return recommended_movie_names, recommended_movie_posters
25
26 st.header('Movie Recommender')
27 movies = pickle.load(open('G:/Projects/Movie Recommender System/movie_list.pkl', 'rb'))
28 similarity = pickle.load(open('G:/Projects/Movie Recommender System/similarity.pkl', 'rb'))
29
30 movie_list = movies['title'].values
31 selected_movie = st.selectbox(
32     "Search or Select a movie from the dropdown",
33     movie_list
```



Source Code for the Main Code Block

```
In [1]: import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)

# Input data files are available in the read-only "Kaggle/input/" directory
# For example, running the following code (by clicking run or pressing Shift+Enter) will list all files under the input directory

import os
for dirname, _, filenames in os.walk('kaggle'):
    for filename in filenames:
        print(os.path.join(dirname, filename))

kaggle\input\tmdb_5000_credits.csv
kaggle\input\tmdb_5000_movies.csv
```

```
In [2]: movies = pd.read_csv('kaggle/input/tmdb_5000_movies.csv')
credits = pd.read_csv('kaggle/input/tmdb_5000_credits.csv')
```

```
In [3]: movies.head(4)
```

Out[3]:	budget	genres	homepage	id	keywords	original_language	original_title	overview	pc
0	237000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	http://www.avatarmovie.com/	19995	[{"id": 1463, "name": "culture clash"}, {"id": ...	en	Avatar	In the 22nd century, a paraplegic Marine is di...	150
1	300000000	[{"id": 12, "name": "Adventure"}, {"id": 14, "...	http://disney.go.com/disneypictures/pirates/	285	[{"id": 270, "name": "ocean"}, {"id": 726, "na...	en	Pirates of the Caribbean: At World's End	Captain Barbossa, long believed to be dead, ha...	139
2	245000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	http://www.sonypictures.com/movies/spectre/	206647	[{"id": 470, "name": "spy"}, {"id": 818, "name...	en	Spectre	A cryptic message from Bond's past sends him o...	101
3	250000000	[{"id": 28, "name": "Action"}, {"id": 80, "nam...	http://www.thedarkknightises.com/	49026	[{"id": 849, "name": "dc comics"}, {"id": 853, ...	en	The Dark Knight Rises	Following the death of District Attorney Harve...	112

```
In [4]: movies.shape
```

```
Out[4]: (4803, 20)
```

```
In [5]: credits.head()
```

Out[5]:	movie_id	title	cast	crew
0	19995	Avatar	[{"cast_id": 242, "character": "Jake Sully", "...	[{"credit_id": "52fe48009251416c750aca23", "de...
1	285	Pirates of the Caribbean: At World's End	[{"cast_id": 4, "character": "Captain Jack Spa...	[{"credit_id": "52fe4232c3a36847f800b579", "de...
2	206647	Spectre	[{"cast_id": 1, "character": "James Bond", "cr...	[{"credit_id": "54805967c3a36829b5002c41", "de...
3	49026	The Dark Knight Rises	[{"cast_id": 2, "character": "Bruce Wayne / Ba...	[{"credit_id": "52fe4781c3a36847f81398c3", "de...
4	49529	John Carter	[{"cast_id": 5, "character": "John Carter", "c...	[{"credit_id": "52fe479ac3a36847f813eaa3", "de...

```
In [6]: credits.shape
```

```
Out[6]: (4803, 4)
```

```
In [7]: movies = movies.merge(credits, on='title')
# Merging the 2 data files on the basis of 'title'
```

```
In [8]: movies.head()
```

Out[8]:	budget	genres	homepage	id	keywords	original_language	original_title	overview	pc
0	237000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	http://www.avatarmovie.com/	19995	[{"id": 1463, "name": "culture clash"}, {"id": ...	en	Avatar	In the 22nd century, a paraplegic Marine is di...	150

1	300000000	{{"id": 12, "name": "Adventure"}, {"id": 14, "name": "Action"}}	http://disney.go.com/disneypictures/pirates/	285	{{"id": 270, "name": "ocean"}, {"id": 726, "name": "na..."}}	en	Pirates of the Caribbean: At World's End	Captain Barbosa, long believed to be dead, ha...	135
2	245000000	{{"id": 28, "name": "Action"}, {"id": 12, "name": "Adventure"}}	http://www.sonypictures.com/movies/spectre/	206647	{{"id": 470, "name": "spy"}, {"id": 818, "name": "James Bond"}}	en	Spectre	A cryptic message from Bond's past sends him o...	105
3	250000000	{{"id": 28, "name": "Action"}, {"id": 80, "name": "The Dark Knight Rises"}}	http://www.thedarkknightrises.com/	49026	{{"id": 849, "name": "dc comics"}, {"id": 853, "name": "Batman"}}	en	The Dark Knight Rises	Following the death of District Attorney Harvey Dent, Batman rises again to save Gotham City from a war...	112
4	260000000	{{"id": 28, "name": "Action"}, {"id": 12, "name": "Adventure"}}	http://movies.disney.com/john-carter	49529	{{"id": 818, "name": "based on novel"}, {"id": 818, "name": "John Carter"}}	en	John Carter	John Carter is a war-weary, former military ca...	43

5 rows x 23 columns

```
In [9]: movies = movies[['movie_id','title','overview','genres','keywords','cast','crew']]
```

```
In [10]: movies.head()
```

	movie_id	title	overview	genres	keywords	cast	crew
0	19995	Avatar	In the 22nd century, a paraplegic Marine is di...	[{"id": 28, "name": "Action"}, {"id": 12, "name": "Adventure"}]	[{"id": 1463, "name": "culture clash"}, {"id": 1463, "name": "culture clash"}]	[{"cast_id": 242, "character": "Jake Sully", "..."}, {"cast_id": 242, "character": "Jake Sully", "..."}]	[{"credit_id": "52fe48009251416c750aca23", "de..."}]
1	285	Pirates of the Caribbean: At World's End	Captain Barbosa, long believed to be dead, ha...	[{"id": 12, "name": "Adventure"}, {"id": 14, "name": "Action"}]	[{"id": 270, "name": "ocean"}, {"id": 726, "name": "na..."}]	[{"cast_id": 4, "character": "Captain Jack Sparrow", "..."}, {"cast_id": 4, "character": "Captain Jack Sparrow", "..."}]	[{"credit_id": "52fe4232c3a36847f800b579", "de..."}]
2	206647	Spectre	A cryptic message from Bond's past sends him o...	[{"id": 28, "name": "Action"}, {"id": 12, "name": "Adventure"}]	[{"id": 470, "name": "spy"}, {"id": 818, "name": "James Bond"}]	[{"cast_id": 1, "character": "James Bond", "cr..."}, {"cast_id": 1, "character": "James Bond", "cr..."}]	[{"credit_id": "54805967c3a36829b5002c41", "de..."}]
3	49026	The Dark Knight Rises	Following the death of District Attorney Harvey...	[{"id": 28, "name": "Action"}, {"id": 80, "name": "The Dark Knight Rises"}]	[{"id": 849, "name": "dc comics"}, {"id": 853, "name": "Batman"}]	[{"cast_id": 2, "character": "Bruce Wayne / Batman", "..."}, {"cast_id": 2, "character": "Bruce Wayne / Batman", "..."}]	[{"credit_id": "52fe4781c3a36847f81398c3", "de..."}]
4	49529	John Carter	John Carter is a war-weary, former military ca...	[{"id": 28, "name": "Action"}, {"id": 12, "name": "Adventure"}]	[{"id": 818, "name": "based on novel"}, {"id": 818, "name": "John Carter"}]	[{"cast_id": 5, "character": "John Carter", "c..."}, {"cast_id": 5, "character": "John Carter", "c..."}]	[{"credit_id": "52fe479ac3a36847f81398c3", "de..."}]

```
In [11]: import ast
```

```
In [12]: def convert(text):
L = []
for i in ast.literal_eval(text):
L.append(i['name'])
return L
```

```
In [13]: movies.dropna(inplace=True)
movies['genres'].head()
```

```
Out[13]: 0 [{"id": 28, "name": "Action"}, {"id": 12, "name": "Adventure"}]
1 [{"id": 12, "name": "Adventure"}, {"id": 14, "name": "Action"}]
2 [{"id": 28, "name": "Action"}, {"id": 12, "name": "Adventure"}]
3 [{"id": 28, "name": "Action"}, {"id": 80, "name": "The Dark Knight Rises"}]
4 [{"id": 28, "name": "Action"}, {"id": 12, "name": "Adventure"}]
Name: genres, dtype: object
```

```
In [14]: movies['genres'] = movies['genres'].apply(convert)
movies.head()
```

	movie_id	title	overview	genres	keywords	cast	crew
0	19995	Avatar	In the 22nd century, a paraplegic Marine is di...	[Action, Adventure, Fantasy, Science Fiction]	[{"id": 1463, "name": "culture clash"}, {"id": 1463, "name": "culture clash"}]	[{"cast_id": 242, "character": "Jake Sully", "..."}, {"cast_id": 242, "character": "Jake Sully", "..."}]	[{"credit_id": "52fe48009251416c750aca23", "de..."}]
1	285	Pirates of the Caribbean: At World's End	Captain Barbosa, long believed to be dead, ha...	[Adventure, Fantasy, Action]	[{"id": 270, "name": "ocean"}, {"id": 726, "name": "na..."}]	[{"cast_id": 4, "character": "Captain Jack Sparrow", "..."}, {"cast_id": 4, "character": "Captain Jack Sparrow", "..."}]	[{"credit_id": "52fe4232c3a36847f800b579", "de..."}]

2	206647	Spectre	A cryptic message from Bond's past sends him o...	[Action, Adventure, Crime]	[{"id": 470, "name": "spy"}, {"id": 818, "name": "...	[{"cast_id": 1, "character": "James Bond", "cr...	[{"credit_id": "54805967c3a36829b5002c41", "de...
3	49026	The Dark Knight Rises	Following the death of District Attorney Harve...	[Action, Crime, Drama, Thriller]	[{"id": 849, "name": "dc comics"}, {"id": 853, "...	[{"cast_id": 2, "character": "Bruce Wayne / Ba...	[{"credit_id": "52fe4781c3a36847f81398c3", "de...
4	49529	John Carter	John Carter is a war-weary, former military ca...	[Action, Adventure, Science Fiction]	[{"id": 818, "name": "based on novel"}, {"id": "...	[{"cast_id": 5, "character": "John Carter", "c...	[{"credit_id": "52fe479ac3a36847f813eaa3", "de...

```
In [15]: movies['keywords'] = movies['keywords'].apply(convert)
movies.head()
```

	movie_id	title	overview	genres	keywords	cast	crew
0	19995	Avatar	In the 22nd century, a paraplegic Marine is di...	[Action, Adventure, Fantasy, Science Fiction]	[culture clash, future, space war, space colon...	[{"cast_id": 242, "character": "Jake Sully", "...	[{"credit_id": "52fe48009251416c750aca23", "de...
1	285	Pirates of the Caribbean: At World's End	Captain Barbossa, long believed to be dead, ha...	[Adventure, Fantasy, Action]	[ocean, drug abuse, exotic island, east india ...	[{"cast_id": 4, "character": "Captain Jack Spa...	[{"credit_id": "52fe4232c3a36847f800b579", "de...
2	206647	Spectre	A cryptic message from Bond's past sends him o...	[Action, Adventure, Crime]	[spy, based on novel, secret agent, sequel, mi...	[{"cast_id": 1, "character": "James Bond", "cr...	[{"credit_id": "54805967c3a36829b5002c41", "de...
3	49026	The Dark Knight Rises	Following the death of District Attorney Harve...	[Action, Crime, Drama, Thriller]	[dc comics, crime fighter, terrorist, secret i...	[{"cast_id": 2, "character": "Bruce Wayne / Ba...	[{"credit_id": "52fe4781c3a36847f81398c3", "de...
4	49529	John Carter	John Carter is a war-weary, former military ca...	[Action, Adventure, Science Fiction]	[based on novel, mars, medallion, space travel...	[{"cast_id": 5, "character": "John Carter", "c...	[{"credit_id": "52fe479ac3a36847f813eaa3", "de...

```
In [16]: import ast
ast.literal_eval([{"id": 28, "name": "Action"}, {"id": 12, "name": "Adventure"}, {"id": 14, "name": "Fantasy"}, {"id": 878, "name": "Science Fiction"}])
```

```
Out[16]: [{"id": 28, 'name': 'Action'},
{'id': 12, 'name': 'Adventure'},
{'id': 14, 'name': 'Fantasy'},
{'id': 878, 'name': 'Science Fiction'}]
```

```
In [17]: movies['cast'] = movies['cast'].apply(convert)
movies.head()
```

	movie_id	title	overview	genres	keywords	cast	crew
0	19995	Avatar	In the 22nd century, a paraplegic Marine is di...	[Action, Adventure, Fantasy, Science Fiction]	[culture clash, future, space war, space colon...	[Sam Worthington, Zoe Saldana, Sigourney Weave...	[{"credit_id": "52fe48009251416c750aca23", "de...
1	285	Pirates of the Caribbean: At World's End	Captain Barbossa, long believed to be dead, ha...	[Adventure, Fantasy, Action]	[ocean, drug abuse, exotic island, east india ...	[Johnny Depp, Orlando Bloom, Keira Knightley, ...	[{"credit_id": "52fe4232c3a36847f800b579", "de...
2	206647	Spectre	A cryptic message from Bond's past sends him o...	[Action, Adventure, Crime]	[spy, based on novel, secret agent, sequel, mi...	[Daniel Craig, Christoph Waltz, Léa Seydoux, R...	[{"credit_id": "54805967c3a36829b5002c41", "de...
3	49026	The Dark Knight Rises	Following the death of District Attorney Harve...	[Action, Crime, Drama, Thriller]	[dc comics, crime fighter, terrorist, secret i...	[Christian Bale, Michael Caine, Gary Oldman, A...	[{"credit_id": "52fe4781c3a36847f81398c3", "de...
4	49529	John Carter	John Carter is a war-weary, former military ca...	[Action, Adventure, Science Fiction]	[based on novel, mars, medallion, space travel...	[Taylor Kitsch, Lynn Collins, Samantha Morton, ...	[{"credit_id": "52fe479ac3a36847f813eaa3", "de...

```
In [18]: movies['cast'] = movies['cast'].apply(lambda x:x[0:3])
```

```
In [19]: def director(text):
L = []
for i in ast.literal_eval(text):
if i['job'] == 'Director':
L.append(i['name'])
return L
```

```
In [20]: movies['crew'] = movies['crew'].apply(director)
```

```
In [21]: movies.sample(5)
```

	movie_id	title	overview	genres	keywords	cast	crew
927	13673	Christmas with the Kranks	Luther Krank is fed up with the commerciality ...	[Comedy, Family]	[holiday, christmas]	[Tim Allen, Jamie Lee Curtis, Dan Aykroyd]	[Joe Roth]

3970	180296	They Came Together	A small business owner is about to lose her sh...	[Comedy]	[]	[Paul Rudd, Amy Poehler, Bill Hader]	[David Wain]
130	13053	Bolt	Bolt is the star of the biggest show in Hollyw...	[Animation, Family, Adventure, Comedy]	[hamster, kids and family, animal, cat vs dog,...]	[John Travolta, Miley Cyrus, Susie Essman]	[Chris Williams, Byron Howard]
381	49852	The Nutcracker: The Untold Story	Set in 1920's Vienna, this a tale of a little ...	[Fantasy, Action, Family]	[]	[Elle Fanning, Nathan Lane, John Turturro]	[Andrei Konchalovsky]
2274	14538	Three Kingdoms: Resurrection of the Dragon	The aging Zhao embarks on his final and greate...	[Action, History, Drama]	[warrior woman, number in title]	[Sammo Hung, Vanness Wu, Maggie Q]	[Daniel Lee]

In [22...

```
def collapse(L):
    L1 = []
    for i in L:
        L1.append(i.replace(" ", ""))
    return L1
```

In [23...

```
movies['cast'] = movies['cast'].apply(collapse)
movies['crew'] = movies['crew'].apply(collapse)
movies['genres'] = movies['genres'].apply(collapse)
movies['keywords'] = movies['keywords'].apply(collapse)
```

In [24...

```
movies.head()
```

Out [24...

	movie_id		title	overview	genres	keywords	cast	crew
0	19995		Avatar	In the 22nd century, a paraplegic Marine is di...	[Action, Adventure, Fantasy, ScienceFiction]	[cultureclash, future, spacewar, spacecolony, ...]	[SamWorthington, ZoeSaldana, SigourneyWeaver]	[JamesCameron]
1	285		Pirates of the Caribbean: At World's End	Captain Barbossa, long believed to be dead, ha...	[Adventure, Fantasy, Action]	[ocean, drugabuse, exoticisland, eastindiatrad...	[JohnnyDepp, OrlandoBloom, KeiraKnightley]	[GoreVerbinski]
2	206647		Spectre	A cryptic message from Bond's past sends him o...	[Action, Adventure, Crime]	[spy, basedonnovel, secretagent, sequel, mi6, ...]	[DanielCraig, ChristophWaltz, LéaSeydoux]	[SamMendes]
3	49026		The Dark Knight Rises	Following the death of District Attorney Harve...	[Action, Crime, Drama, Thriller]	[dccomics, crimefighter, terrorist, secretiden...	[ChristianBale, MichaelCaine, GaryOldman]	[ChristopherNolan]
4	49529		John Carter	John Carter is a war-weary, former military ca...	[Action, Adventure, ScienceFiction]	[basedonnovel, mars, medallion, spacetravel, p...	[TaylorKitsch, LynnCollins, SamanthaMorton]	[AndrewStanton]

In [25...

```
movies['overview'] = movies['overview'].apply(lambda x:x.split())
```

In [26...

```
movies['tags'] = movies['overview'] + movies['genres'] + movies['keywords'] + movies['cast'] + movies['crew']
```

In [27...

```
new = movies.drop(columns=['overview','genres','keywords','cast','crew'])
```

In [28...

```
new['tags'] = new['tags'].apply(lambda x: " ".join(x))
new.head()
```

Out [28...

	movie_id		title	tags
0	19995	Avatar	In the 22nd century, a paraplegic Marine is di...	
1	285	Pirates of the Caribbean: At World's End	Captain Barbossa, long believed to be dead, ha...	
2	206647	Spectre	A cryptic message from Bond's past sends him o...	
3	49026	The Dark Knight Rises	Following the death of District Attorney Harve...	
4	49529	John Carter	John Carter is a war-weary, former military ca...	

In [29...

```
from sklearn.feature_extraction.text import CountVectorizer
cv = CountVectorizer(max_features=5000,stop_words='english')
```

In [30...

```
vector = cv.fit_transform(new['tags']).toarray()
```

In [31...

```
vector.shape
```

Out [31...

```
(4806, 5000)
```

In [32...

```
from sklearn.metrics.pairwise import cosine_similarity
```

In [33...

```
similarity = cosine_similarity(vector)
```

In [34...

```
similarity
```

```
Out [34...] array([[1.          , 0.08964215, 0.06071767, ..., 0.02519763, 0.0277885 ,
        0.          ],
       [0.08964215, 1.          , 0.06350006, ..., 0.02635231, 0.          ,
        0.          ],
       [0.06071767, 0.06350006, 1.          , ..., 0.02677398, 0.          ,
        0.          ],
       ...,
       [0.02519763, 0.02635231, 0.02677398, ..., 1.          , 0.07352146,
        0.04774099],
       [0.0277885 , 0.          , 0.          , ..., 0.07352146, 1.          ,
        0.05264981],
       [0.          , 0.          , 0.          , ..., 0.04774099, 0.05264981,
        1.          ]])
```

```
In [35...] new[new['title'] == 'John Carter'].index[0]
```

```
Out [35...] 4
```

```
In [36...] def recommender(movie):
            index = new[new['title'] == movie].index[0]
            distances = sorted(list(enumerate(similarity[index])),reverse=True,key = lambda x: x[1])
            for i in distances[1:10]:
                print(new.iloc[i[0]].title)
```

```
In [37...] recommender('Gandhi')
```

Gandhi, My Father
The Wind That Shakes the Barley
A Passage to India
Guiana 1838
Ramanujan
Bloody Sunday
Mr. Turner
Rang De Basanti
Wah-Wah

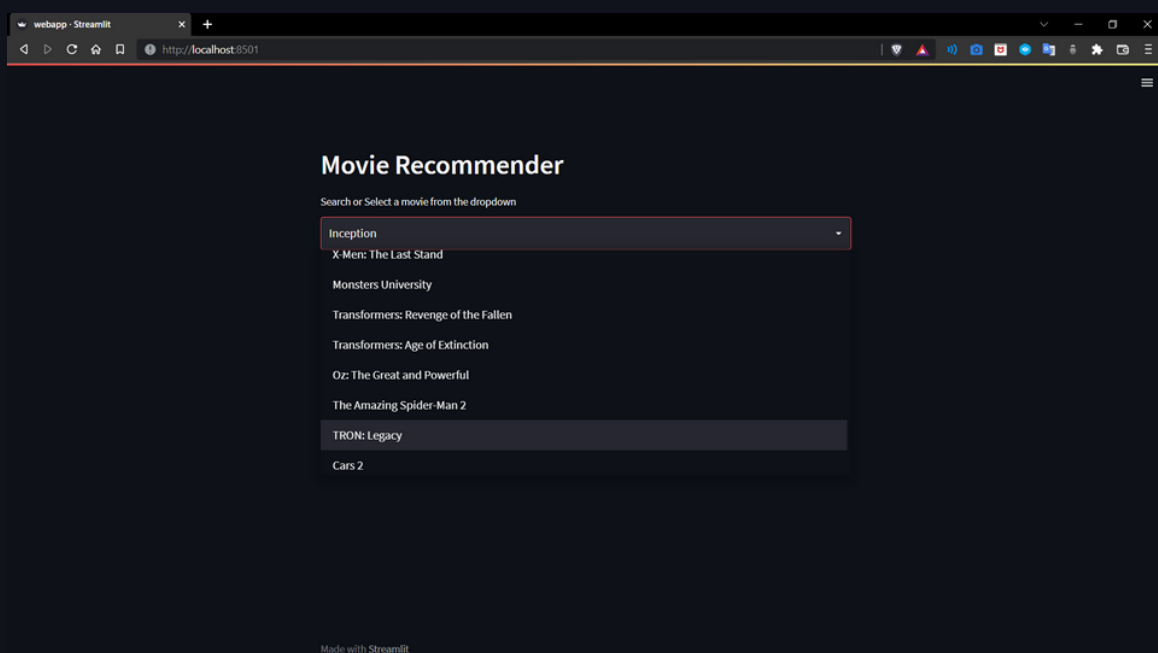
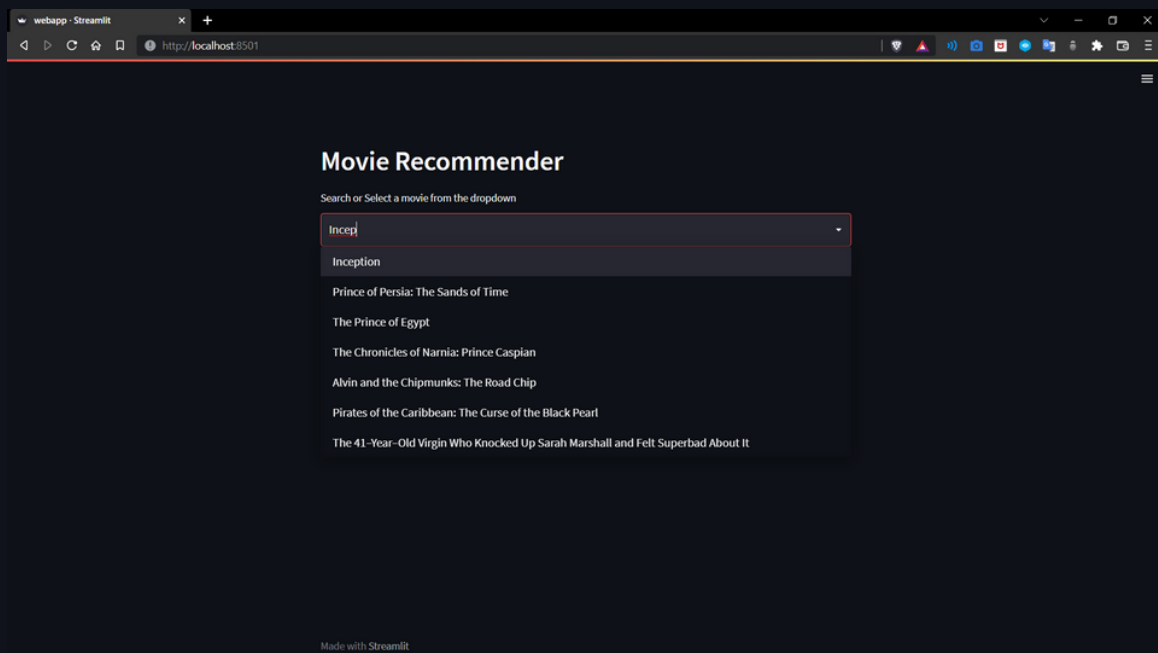
```
In [38...] import pickle
```

```
In [39...] pickle.dump(new,open('movie_list.pkl','wb'))
            pickle.dump(similarity,open('similarity.pkl','wb'))
```

Different stages of the program

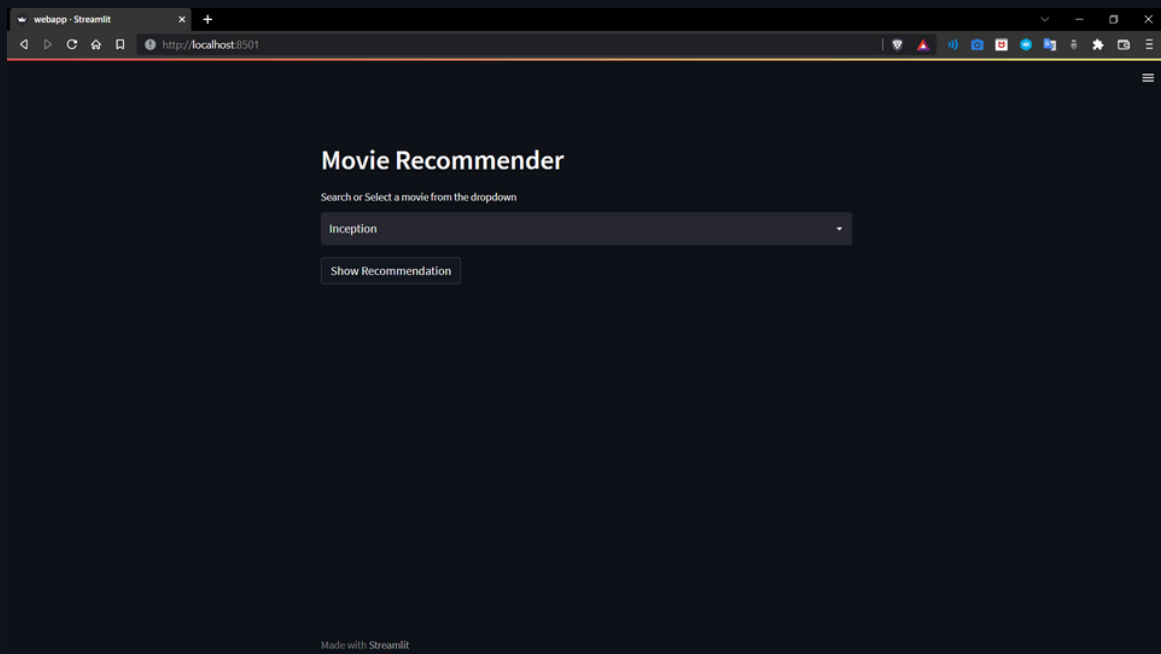
Step 1: The User enters his last watched movie

As the title suggests, the user needs to enter his last watched movie, based upon which he desires recommendations. Here the user is given the option to type in his last watched movie or select the movie from the pre existing list of movies from the drop down list.



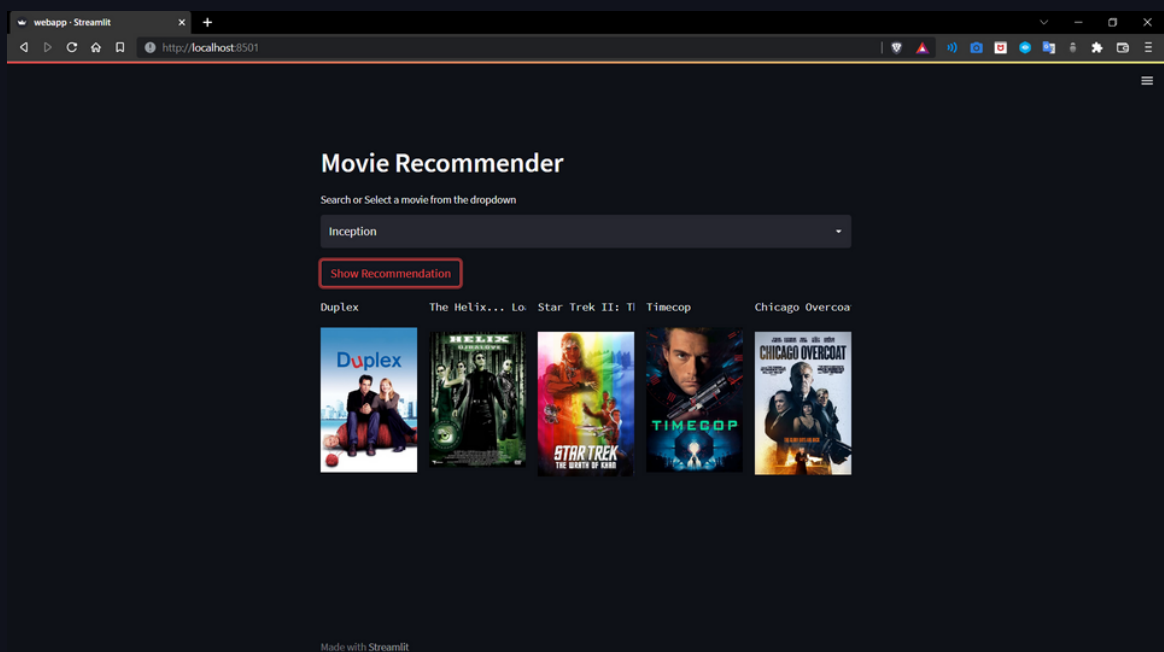
Step 2: The User asks for recommending movies based on his entered movie

The user now clicks on to “Show Recommendations” button which then provides the user with top 5 recommendations related to his entered movie.



Step 3: The User gets his recommendations

The User gets five recommendations based on his last watched movie.



Sources of the datasets

TMDB 5000 movies dataset has been used for this project. The dataset can be collected from: <https://www.kaggle.com/tmdb/tmdb-movie-metadata>