

Importing Library

```
import pandas as pd
import numpy as np
import ast
import nltk
from nltk.stem import PorterStemmer
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.metrics.pairwise import cosine_similarity
import warnings
warnings.filterwarnings('ignore')

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

def merge(df1,df2):
    df1['title']=df1['original_title']
    df1=df1.merge(df2,on='title')
    return df1

movie1=merge(movies,credits)

movie1.head()
```

	budget	genres \
0	237000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...
1	300000000	[{"id": 12, "name": "Adventure"}, {"id": 14, "...
2	245000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...
3	250000000	[{"id": 28, "name": "Action"}, {"id": 80, "nam...
4	260000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...

	homepage	id \
0	http://www.avatarmovie.com/	19995
1	http://disney.go.com/disneypictures/pirates/	285
2	http://www.sonypictures.com/movies/spectre/	206647
3	http://www.thedarkknightrisers.com/	49026
4	http://movies.disney.com/john-carter	49529

	keywords	original_language
0	[{"id": 1463, "name": "culture clash"}, {"id": ...	en
1	[{"id": 270, "name": "ocean"}, {"id": 726, "na...	en
2	[{"id": 470, "name": "spy"}, {"id": 818, "name...	en
3	[{"id": 849, "name": "dc comics"}, {"id": 853, ...	en
4	[{"id": 818, "name": "based on novel"}, {"id": ...	en

	original_title \	
0	Avatar	
1	Pirates of the Caribbean: At World's End	
2	Spectre	
3	The Dark Knight Rises	
4	John Carter	

	overview	popularity \
0	In the 22nd century, a paraplegic Marine is di...	150.437577
1	Captain Barbossa, long believed to be dead, ha...	139.082615
2	A cryptic message from Bond's past sends him o...	107.376788
3	Following the death of District Attorney Harve...	112.312950
4	John Carter is a war-weary, former military ca...	43.926995

	production_companies	... runtime \
0	[{"name": "Ingenious Film Partners", "id": 289...	... 162.0
1	[{"name": "Walt Disney Pictures", "id": 2}, {"...	... 169.0
2	[{"name": "Columbia Pictures", "id": 5}, {"nam...	... 148.0
3	[{"name": "Legendary Pictures", "id": 923}, {"...	... 165.0
4	[{"name": "Walt Disney Pictures", "id": 2}]	... 132.0

	spoken_languages	status \
0	[{"iso_639_1": "en", "name": "English"}, {"iso...	Released
1	[{"iso_639_1": "en", "name": "English"}]	Released
2	[{"iso_639_1": "fr", "name": "Fran\u00e7ais"},...	Released
3	[{"iso_639_1": "en", "name": "English"}]	Released
4	[{"iso_639_1": "en", "name": "English"}]	Released

	tagline \
0	Enter the World of Pandora.
1	At the end of the world, the adventure begins.
2	A Plan No One Escapes
3	The Legend Ends
4	Lost in our world, found in another.

	title	vote_average	vote_count
movie_id \			
0	Avatar	7.2	11800
19995			
1	Pirates of the Caribbean: At World's End	6.9	4500
285			
2	Spectre	6.3	4466
206647			
3	The Dark Knight Rises	7.6	9106
49026			
4	John Carter	6.1	2124
49529			

	cast \
0	[{"cast_id": 242, "character": "Jake Sully", "...

```

1 [{"cast_id": 4, "character": "Captain Jack Spa...
2 [{"cast_id": 1, "character": "James Bond", "cr...
3 [{"cast_id": 2, "character": "Bruce Wayne / Ba...
4 [{"cast_id": 5, "character": "John Carter", "c...

                                crew
0 [{"credit_id": "52fe48009251416c750aca23", "de...
1 [{"credit_id": "52fe4232c3a36847f800b579", "de...
2 [{"credit_id": "54805967c3a36829b5002c41", "de...
3 [{"credit_id": "52fe4781c3a36847f81398c3", "de...
4 [{"credit_id": "52fe479ac3a36847f813eaa3", "de...

[5 rows x 23 columns]

```

Before Merge

```

credits.shape
(4803, 4)

movies.shape
(4803, 20)

```

After Merge

```

movie1.shape
(4547, 23)

## Keeping important columns for recommendation
movie1=movie1[['movie_id','title','overview','genres','keywords','cast',
               ','crew']]

movie1.isnull().sum()

movie_id      0
title         0
overview      3
genres        0
keywords      0
cast          0
crew          0
dtype: int64

movie1.dropna(inplace=True)

movie1.isnull().sum()

movie_id      0
title         0

```

```

overview      0
genres        0
keywords      0
cast          0
crew          0
dtype: int64

movie1.shape

(4544, 7)

movie1['genres'].iloc[0]

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

#converting string to list of genres and keywords

```

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

```
movie1['genres']=movie1['genres'].apply(convert)
```

```
movie1['keywords']=movie1['keywords'].apply(convert)
```

```
movie1.head()
```

	movie_id	title \
0	19995	Avatar
1	285	Pirates of the Caribbean: At World's End
2	206647	Spectre
3	49026	The Dark Knight Rises
4	49529	John Carter

	overview \
0	In the 22nd century, a paraplegic Marine is di...
1	Captain Barbossa, long believed to be dead, ha...
2	A cryptic message from Bond's past sends him o...
3	Following the death of District Attorney Harve...
4	John Carter is a war-weary, former military ca...

	genres \
0	[Action, Adventure, Fantasy, Science Fiction]
1	[Adventure, Fantasy, Action]
2	[Action, Adventure, Crime]
3	[Action, Crime, Drama, Thriller]
4	[Action, Adventure, Science Fiction]

```

                                keywords \
0 [culture clash, future, space war, space colon...
1 [ocean, drug abuse, exotic island, east india ...
2 [spy, based on novel, secret agent, sequel, mi...
3 [dc comics, crime fighter, terrorist, secret i...
4 [based on novel, mars, medallion, space travel...

```

```

                                cast \
0 [{"cast_id": 242, "character": "Jake Sully", "...
1 [{"cast_id": 4, "character": "Captain Jack Spa...
2 [{"cast_id": 1, "character": "James Bond", "cr...
3 [{"cast_id": 2, "character": "Bruce Wayne / Ba...
4 [{"cast_id": 5, "character": "John Carter", "c...

```

```

                                crew
0 [{"credit_id": "52fe48009251416c750aca23", "de...
1 [{"credit_id": "52fe4232c3a36847f800b579", "de...
2 [{"credit_id": "54805967c3a36829b5002c41", "de...
3 [{"credit_id": "52fe4781c3a36847f81398c3", "de...
4 [{"credit_id": "52fe479ac3a36847f813eaa3", "de...

```

```

movie1['cast'].iloc[0]

```

```

'[{
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/ Troupe", "credit_id": "52fe48019251416c750acb6f", "gender": 1, "id":
42286, "name": "Julene Renee", "order": 82}]]'
```

#converting string to list of cast and crew

```
def convert1(text):
    L=[]
    counter=0
    for i in ast.literal_eval(text):
        if counter <3:
            L.append(i['name'])
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"gender": 0, "id": 1483220, "job": "CG Supervisor", "name": "Brad
Alexander"}, {"credit_id": "5592b05592514152d80012f6", "department":
"Crew", "gender": 0, "id": 1483221, "job": "CG Supervisor", "name":
"Shadi Almassizadeh"}, {"credit_id": "5592b090c3a36877570010b5",
"department": "Crew", "gender": 0, "id": 1483222, "job": "CG
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"5592b0dbc3a368774b00112c", "department": "Crew", "gender": 0, "id":
1483223, "job": "CG Supervisor", "name": "Graeme Demmocks"},
{"credit_id": "5592b0fe92514152db0010c1", "department": "Crew",
"gender": 0, "id": 1483224, "job": "CG Supervisor", "name": "Adrian
Fernandes"}, {"credit_id": "5592b11f9251415df8001059", "department":
"Crew", "gender": 0, "id": 1483225, "job": "CG Supervisor", "name":
"Mitch Gates"}, {"credit_id": "5592b15dc3a3687745001645",
"department": "Crew", "gender": 0, "id": 1483226, "job": "CG
Supervisor", "name": "Jerry Kung"}, {"credit_id":
"5592b18e925141645a0004ae", "department": "Crew", "gender": 0, "id":
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"5592b1bfc3a368775d0010e7", "department": "Crew", "gender": 0, "id":
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{"credit_id": "5592b2049251415df8001078", "department": "Crew",
"gender": 0, "id": 1483229, "job": "CG Supervisor", "name": "Matthias
Menz"}, {"credit_id": "5592b27b92514152d800136a", "department":
"Crew", "gender": 0, "id": 1483230, "job": "CG Supervisor", "name":
"Sergei Nevshupov"}, {"credit_id": "5592b2c3c3a36869e800003c",
"department": "Crew", "gender": 0, "id": 1483231, "job": "CG
Supervisor", "name": "Philippe Rebours"}, {"credit_id":
"5592b317c3a36877470012af", "department": "Crew", "gender": 0, "id":
1483232, "job": "CG Supervisor", "name": "Michael Takarangi"},
{"credit_id": "5592b345c3a36877470012bb", "department": "Crew",
"gender": 0, "id": 1483233, "job": "CG Supervisor", "name": "David
Weitzberg"}, {"credit_id": "5592b37cc3a368775100113b", "department":
"Crew", "gender": 0, "id": 1483234, "job": "CG Supervisor", "name":
"Ben White"}, {"credit_id": "573c8e2f9251413f5d000094", "department":
"Crew", "gender": 1, "id": 1621932, "job": "Stunts", "name": "Min
Windle"}]]'
```



```
#converting string to list of director
```

```
def convert1(text):
```

```
    L=[]
```

```
    for i in ast.literal_eval(text):
```

```
        if i['job']=='Director':
```

```
            L.append(i['name'])
```

```
    return L
```

```
movie1['crew']=movie1['crew'].apply(convert1)
```

```
movie1.head()
```

	movie_id		title \
0	19995		Avatar
1	285	Pirates of the Caribbean: At World's End	
2	206647		Spectre
3	49026	The Dark Knight Rises	
4	49529		John Carter

	overview \
0	In the 22nd century, a paraplegic Marine is di...
1	Captain Barbossa, long believed to be dead, ha...
2	A cryptic message from Bond's past sends him o...
3	Following the death of District Attorney Harve...
4	John Carter is a war-weary, former military ca...

	genres \
0	[Action, Adventure, Fantasy, Science Fiction]
1	[Adventure, Fantasy, Action]
2	[Action, Adventure, Crime]
3	[Action, Crime, Drama, Thriller]
4	[Action, Adventure, Science Fiction]

	keywords \
0	[culture clash, future, space war, space colon...
1	[ocean, drug abuse, exotic island, east india ...
2	[spy, based on novel, secret agent, sequel, mi...
3	[dc comics, crime fighter, terrorist, secret i...
4	[based on novel, mars, medallion, space travel...

	cast
crew	
0	[Sam Worthington, Zoe Saldana, Sigourney Weaver] [James Cameron]
1	[Johnny Depp, Orlando Bloom, Keira Knightley] [Gore Verbinski]
2	[Daniel Craig, Christoph Waltz, Léa Seydoux] [Sam Mendes]
3	[Christian Bale, Michael Caine, Gary Oldman] [Christopher Nolan]

```
4 [Taylor Kitsch, Lynn Collins, Samantha Morton] [Andrew Stanton]
```

```
movie1['overview'].iloc[0]
```

```
'In the 22nd century, a paraplegic Marine is dispatched to the moon Pandora on a unique mission, but becomes torn between following orders and protecting an alien civilization.'
```

```
def remove_space(text):  
    L=[]  
    for i in text:  
        L.append(i.replace(' ',''))  
    return L
```

```
movie1['crew']=movie1['crew'].apply(remove_space)  
movie1['cast']=movie1['cast'].apply(remove_space)  
movie1['genres']=movie1['genres'].apply(remove_space)  
movie1['keywords']=movie1['keywords'].apply(remove_space)
```

```
movie1.head()
```

	movie_id	title \
0	19995	Avatar
1	285	Pirates of the Caribbean: At World's End
2	206647	Spectre
3	49026	The Dark Knight Rises
4	49529	John Carter

	overview \
0	In the 22nd century, a paraplegic Marine is di...
1	Captain Barbossa, long believed to be dead, ha...
2	A cryptic message from Bond's past sends him o...
3	Following the death of District Attorney Harve...
4	John Carter is a war-weary, former military ca...

	genres \
0	[Action, Adventure, Fantasy, ScienceFiction]
1	[Adventure, Fantasy, Action]
2	[Action, Adventure, Crime]
3	[Action, Crime, Drama, Thriller]
4	[Action, Adventure, ScienceFiction]

	keywords \
0	[cultureclash, future, spacewar, spacecolony, ...
1	[ocean, drugabuse, exoticisland, eastindiatrad...
2	[spy, basedonnovel, secretagent, sequel, mi6, ...
3	[dccomics, crimefighter, terrorist, secretiden...
4	[basedonnovel, mars, medallion, spacetravel, p...

cast

crew

```

0 [SamWorthington, ZoeSaldana, SigourneyWeaver] [JamesCameron]
1 [JohnnyDepp, OrlandoBloom, KeiraKnightley] [GoreVerbinski]
2 [DanielCraig, ChristophWaltz, LéaSeydoux] [SamMendes]
3 [ChristianBale, MichaelCaine, GaryOldman] [ChristopherNolan]
4 [TaylorKitsch, LynnCollins, SamanthaMorton] [AndrewStanton]

```

```

# Explode the 'genres' column to create separate rows for each genre
exploded_df = movie1['genres'].explode()

```

```

# Get value counts for each genre
value_counts = exploded_df.value_counts()

```

```
value_counts
```

```

Drama      2136
Comedy      1660
Thriller    1225
Action      1093
Romance      851
Adventure    751
Crime        663
ScienceFiction 517
Horror       500
Family       494
Fantasy      397
Mystery      332
Animation    208
Music        180
History      169
War          125
Documentary  102
Western      78
Foreign      22
TVMovie      8

```

```
Name: genres, dtype: int64
```

```
movie1['overview'] = movie1['overview'].apply(lambda x:x.split())
```

```
# Concatenate all
```

```

movie1['tags'] =movie1['overview']+ movie1['genres'] +
movie1['keywords'] + movie1['cast'] + movie1['crew']

```

```
movie1.head()
```

	movie_id	title \
0	19995	Avatar
1	285	Pirates of the Caribbean: At World's End
2	206647	Spectre
3	49026	The Dark Knight Rises
4	49529	John Carter

```

                                overview \
0 [In, the, 22nd, century,, a, paraplegic, Marin...
1 [Captain, Barbossa,, long, believed, to, be, d...
2 [A, cryptic, message, from, Bond's, past, send...
3 [Following, the, death, of, District, Attorney...
4 [John, Carter, is, a, war-weary,, former, mili...

                                genres \
0 [Action, Adventure, Fantasy, ScienceFiction]
1 [Adventure, Fantasy, Action]
2 [Action, Adventure, Crime]
3 [Action, Crime, Drama, Thriller]
4 [Action, Adventure, ScienceFiction]

                                keywords \
0 [cultureclash, future, spacewar, spacecolony, ...
1 [ocean, drugabuse, exoticisland, eastindiatrad...
2 [spy, basedonnovel, secretagent, sequel, mi6, ...
3 [dccomics, crimefighter, terrorist, secretiden...
4 [basedonnovel, mars, medallion, spacetravel, p...

                                cast
crew \
0 [SamWorthington, ZoeSaldana, SigourneyWeaver] [JamesCameron]
1 [JohnnyDepp, OrlandoBloom, KeiraKnightley] [GoreVerbinski]
2 [DanielCraig, ChristophWaltz, LéaSeydoux] [SamMendes]
3 [ChristianBale, MichaelCaine, GaryOldman] [ChristopherNolan]
4 [TaylorKitsch, LynnCollins, SamanthaMorton] [AndrewStanton]

                                tags
0 [In, the, 22nd, century,, a, paraplegic, Marin...
1 [Captain, Barbossa,, long, believed, to, be, d...
2 [A, cryptic, message, from, Bond's, past, send...
3 [Following, the, death, of, District, Attorney...
4 [John, Carter, is, a, war-weary,, former, mili...

movie1.iloc[0]['tags']

['In',
 'the',
 '22nd',
 'century,',
 'a',
 'paraplegic',
 'Marine',
 'is',

```

```
'dispatched',  
'to',  
'the',  
'moon',  
'Pandora',  
'on',  
'a',  
'unique',  
'mission',  
'but',  
'becomes',  
'torn',  
'between',  
'following',  
'orders',  
'and',  
'protecting',  
'an',  
'alien',  
'civilization.',  
'Action',  
'Adventure',  
'Fantasy',  
'ScienceFiction',  
'cultureclash',  
'future',  
'spacewar',  
'spacecolony',  
'society',  
'spacetravel',  
'futuristic',  
'romance',  
'space',  
'alien',  
'tribe',  
'alienplanet',  
'cgi',  
'marine',  
'soldier',  
'battle',  
'loveaffair',  
'antiwar',  
'powerrelations',  
'mindandsoul',  
'3d',  
'SamWorthington',  
'ZoeSaldana',  
'SigourneyWeaver',  
'JamesCameron']
```

```
#dropping extra columns
```

```
df=movie1[['movie_id','title','tags']]
```

```
df.head()
```

	movie_id	title \
0	19995	Avatar
1	285	Pirates of the Caribbean: At World's End
2	206647	Spectre
3	49026	The Dark Knight Rises
4	49529	John Carter

	tags
0	[In, the, 22nd, century,, a, paraplegic, Marin...
1	[Captain, Barbossa,, long, believed, to, be, d...
2	[A, cryptic, message, from, Bond's, past, send...
3	[Following, the, death, of, District, Attorney...
4	[John, Carter, is, a, war-weary,, former, mili...

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

```
C:\Users\Dipes\AppData\Local\Temp\ipykernel_23132\2493417758.py:1:
```

```
SettingWithCopyWarning:
```

```
A value is trying to be set on a copy of a slice from a DataFrame.
```

```
Try using .loc[row_indexer,col_indexer] = value instead
```

```
See the caveats in the documentation:
```

```
https://pandas.pydata.org/pandas-docs/stable/user\_guide/indexing.html#returning-a-view-versus-a-copy
```

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

```
df.head()
```

	movie_id	title \
0	19995	Avatar
1	285	Pirates of the Caribbean: At World's End
2	206647	Spectre
3	49026	The Dark Knight Rises
4	49529	John Carter

	tags
0	In the 22nd century, a paraplegic Marine is di...
1	Captain Barbossa, long believed to be dead, ha...
2	A cryptic message from Bond's past sends him o...
3	Following the death of District Attorney Harve...
4	John Carter is a war-weary, former military ca...

```
df['tags']=df['tags'].apply(lambda x:x.lower())
```

```
C:\Users\Dipes\AppData\Local\Temp\ipykernel_23132\2034404066.py:1:
```

```
SettingWithCopyWarning:
```

A value is trying to be set on a copy of a slice from a DataFrame.
Try using `.loc[row_indexer,col_indexer] = value` instead

See the caveats in the documentation:

https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy

```
df['tags']=df['tags'].apply(lambda x:x.lower())
```

```
df.head()
```

	movie_id	title \
0	19995	Avatar
1	285	Pirates of the Caribbean: At World's End
2	206647	Spectre
3	49026	The Dark Knight Rises
4	49529	John Carter

	tags
0	in the 22nd century, a paraplegic marine is di...
1	captain barbossa, long believed to be dead, ha...
2	a cryptic message from bond's past sends him o...
3	following the death of district attorney harve...
4	john carter is a war-weary, former military ca...

```
PS=PorterStemmer()
```

```
def stems(text):  
    T = []  
  
    for i in text.split():  
        T.append(PS.stem(i))  
  
    return " ".join(T)
```

```
df['tags'] = df['tags'].apply(stems)
```

C:\Users\Dipes\AppData\Local\Temp\ipykernel_23132\2814371920.py:1:
SettingWithCopyWarning:

A value is trying to be set on a copy of a slice from a DataFrame.
Try using `.loc[row_indexer,col_indexer] = value` instead

See the caveats in the documentation:

https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy

```
df['tags'] = df['tags'].apply(stems)
```

```
df.iloc[0]['tags']
```

'in the 22nd century, a parapleg marin is dispatch to the moon pandora
on a uniqu mission, but becom torn between follow order and protect an
alien civilization. action adventur fantasi sciencefict cultureclash

```
futur spacewar spacecoloni societi spacetravel futurist romanc space  
alien tribe alienplanet cgi marin soldier battl loveaffair antiwar  
powerrel mindandsoul 3d samworthington zoesaldana sigourneyweav  
jamescameron'
```

```
cv = CountVectorizer(max_features=5000, stop_words='english')
```

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

```
vector.shape
```

```
(4544, 5000)
```

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

```
similarity.shape
```

```
(4544, 4544)
```

```
#Top 10 movies recommendation
```

```
def recommend(movie):
```

```
    index = df[df['title'] == movie].index[0]
```

```
    distances =
```

```
    sorted(list(enumerate(similarity[index])), reverse=True, key = lambda x:  
x[1])
```

```
        for i in distances[1:11]:
```

```
            print(df.iloc[i[0]].title)
```

```
recommend('Iron Man')
```

```
Iron Man 3
```

```
Iron Man 2
```

```
Avengers: Age of Ultron
```

```
The Avengers
```

```
Captain America: Civil War
```

```
Guardians of the Galaxy
```

```
X-Men
```

```
Ant-Man
```

```
X-Men Origins: Wolverine
```

```
Thor: The Dark World
```