```
In [1]:  #### 1. Import liabraries or packages
         import pandas as pd
         import numpy as np
```

```
In [2]:  ### 2. Load the data (Got the data from 'TMDB 5000 movie dataset')
         movies = pd.read_csv('movie_recomm_Dataset/tmdb_5000_movies.csv')
         credits = pd.read_csv("movie_recomm_Dataset/tmdb_5000_credits.csv")
```

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

Out[3]:

	budget	genres	homepage	id	keywords	original_language	original_title	overview	popularity
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...	150.437577
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...	139.082615
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...	107.376788
3	250000000	[{"id": 28, "name": "Action"}, {"id": 80, "nam...	http://www.thedarkknightrises.com/	49026	[{"id": 849, "name": "dc comics"}, {"id": 853,...	en	The Dark Knight Rises	Following the death of District Attorney Harve...	112.312950
4	260000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	http://movies.disney.com/john-carter	49529	[{"id": 818, "name": "based on novel"}, {"id":...	en	John Carter	John Carter is a war-weary, former military ca...	43.926995

```
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]:  ### To see the data in particular column

         credits.iloc[0].crew
```

Out[7]:
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1401809, "job": "Animation Director", "name": "Orlando Meunier"}, {"credit_id": "54959fb6c3a3686af3003f54", "department": "Visual Effects", "gender": 0, "id": 1401810, "job": "Animation Director", "name": "Taisuke Tanimura"}, {"credit_id": "54959fd2c3a36831b8001e02", "department": "Costume & Make-Up", "gender": 0, "id": 1401812, "job": "Set Costumer", "name": "Lilia Mishel Acevedo"}, {"credit_id": "54959ff9c3a3686ae300440c", "department": "Costume & Make-Up", "gender": 0, "id": 1401814, "job": "Set Costumer", "name": "Alejandro M. Hernandez"}, {"credit_id": "5495a0ddc3a3686ae10046fe", "department": "Editing", "gender": 0, "id": 1401815, "job": "Digital Intermediate", "name": "Marvin Hall"}, {"credit_id": "5495a1f7c3a3686ae3004443", "department": "Production", "gender": 0, "id": 1401816, "job": "Publicist", "name": "Judy Alley"}, {"credit_id": "5592b29fc3a36869d100002f", "department": "Crew", "gender": 0, "id": 1418381, "job": "CG Supervisor", "name": "Mike Perry"}, {"credit_id": "5592b23a9251415df8001081", "department": "Crew", "gender": 0, "id": 1426854, "job": "CG Supervisor", "name": "Andrew Morley"}, {"credit_id": "55491e1192514104c40002d8", "department": "Art", "gender": 0, "id": 1438901, "job": "Conceptual Design", "name": "Seth Engstrom"}, {"credit_id": "5525d5809251417276002b06", "department": "Crew", "gender": 0, "id": 1447362, "job": "Visual Effects Art Director", "name": "Eric Oliver"}, {"credit_id": "554427ca925141586500312a", "department": "Visual Effects", "gender": 0, "id": 1447503, "job": "Modeling", "name": "Matsune Suzuki"}, {"credit_id": "551906889251415aab001c88", "department": "Art", "gender": 0, "id": 1447524, "job": "Art Department Manager", "name": "Paul Tobin"}, {"credit_id": "5592af8492514152cc0010de", "department": "Costume & Make-Up", "gender": 0, "id": 1452643, "job": "Hairstylist", "name": "Roxane Griffin"}, {"credit_id": "553d3c1092514158520001318", "department": "Lighting", "gender": 0, "id": 1453938, "job": "Lighting Artist", "name": "Arun Ram-Mohan"}, {"credit_id": "5592af4692514152d5001355", "department": "Costume & Make-Up", "gender": 0, "id": 1457305, "job": "Makeup Artist", "name": "Georgia Lockhart-Adams"}, {"credit_id": "5592b2eac3a36877470012a5", "department": "Crew", "gender": 0, "id": 1466035, "job": "CG Supervisor", "name": "Thrain Shadbolt"}, {"credit_id": "5592b032c3a36877450015f1", "department": "Crew", "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 Supervisor", "name": "Simon Clutterbuck"}, {"credit_id": "5592b0dbc3a368774b00112c", "department": "Crew", "gender": 0, "id": 1483223, "job": "CG Supervisor", "name": "Graeme Demmocks"}, {"credit_id": "5592b0fe92514152db0010c1", "department": "Crew", "gender": 0, "id": 1483

224, "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": 1483227, "job": "CG Supervisor", "name": "Andy Lomas"}, {"credit_id": "5592b1bfc3a368775d0010e7", "department": "Crew", "gender": 0, "id": 1483228, "job": "CG Supervisor", "name": "Sebastian Marino"}, {"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"}]'

In [8]:
```python
### as now we got some idea about the data in both dataset
### but we cannot apply logic on both the data so we have to merge it on the basis of common column
```

In [8]:
```python
credits.columns
```

Out[8]:
```
Index(['movie_id', 'title', 'cast', 'crew'], dtype='object')
```

In [9]:
```python
movies.columns
```

Out[9]:
```
Index(['budget', 'genres', 'homepage', 'id', 'keywords', 'original_language',
       'original_title', 'overview', 'popularity', 'production_companies',
       'production_countries', 'release_date', 'revenue', 'runtime',
       'spoken_languages', 'status', 'tagline', 'title', 'vote_average',
       'vote_count'],
      dtype='object')
```

In [11]:
```python
### in movies we have "id", 'title' and in credits we have 'movie_id', 'title'
### above are the 2 column from either of the column we can merge the data
```

In [10]:
```python
### merge the data

movies = movies.merge(credits, on = 'title')
```

In [11]:
```python
movies.head()
```

Out[11]:

	budget	genres	homepage	id	keywords	original_language	original_title	overview	popularity
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...	150.437577
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...	139.082615
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...	107.376788
3	250000000	[{"id": 28, "name": "Action"}, {"id": 80, "nam...	http://www.thedarkknightrises.com/	49026	[{"id": 849, "name": "dc comics"}, {"id": 853,...	en	The Dark Knight Rises	Following the death of District Attorney Harve...	112.312950
4	260000000	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	http://movies.disney.com/john-carter	49529	[{"id": 818, "name": "based on novel"}, {"id":...	en	John Carter	John Carter is a war-weary, former military ca...	43.926995

5 rows × 23 columns

In [12]:
```python
movies.shape
```

Out[12]:
```
(4809, 23)
```

In [13]:
```python
movies.columns
```

```
Index(['budget', 'genres', 'homepage', 'id', 'keywords', 'original_language',
       'original_title', 'overview', 'popularity', 'production_companies',
       'production_countries', 'release_date', 'revenue', 'runtime',
       'spoken_languages', 'status', 'tagline', 'title', 'vote_average',
       'vote_count', 'movie_id', 'cast', 'crew'],
      dtype='object')
```

In [16]:
```
### now after merging we have 23 columns, and from this many columns we have to remove the unwanted columns
### lets prepare the list of columns required for creating recommendation model
```

In [14]:
```
# Required columns
columns_list = ['movie_id','title','overview','genres','keywords','cast','crew']

movies = movies[columns_list]

movies
```

Out[14]:

	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, "nam...	[{"id": 1463, "name": "culture clash"}, {"id":...	[{"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...	[{"id": 12, "name": "Adventure"}, {"id": 14, "...	[{"id": 270, "name": "ocean"}, {"id": 726, "na...	[{"cast_id": 4, "character": "Captain Jack Spa...	[{"credit_id": "52fe4232c3a36847f800b579", "de...
2	206647	Spectre	A cryptic message from Bond's past sends him o...	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	[{"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...	[{"id": 28, "name": "Action"}, {"id": 80, "nam...	[{"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...	[{"id": 28, "name": "Action"}, {"id": 12, "nam...	[{"id": 818, "name": "based on novel"}, {"id":...	[{"cast_id": 5, "character": "John Carter", "c...	[{"credit_id": "52fe479ac3a36847f813eaa3", "de...
...	...	...	...	...	...	...	...
4804	9367	El Mariachi	El Mariachi just wants to play his guitar and ...	[{"id": 28, "name": "Action"}, {"id": 80, "nam...	[{"id": 5616, "name": "united states\u2013mexi...	[{"cast_id": 1, "character": "El Mariachi", "c...	[{"credit_id": "52fe44eec3a36847f80b280b", "de...
4805	72766	Newlyweds	A newlywed couple's honeymoon is upended by th...	[{"id": 35, "name": "Comedy"}, {"id": 10749, "...	[]	[{"cast_id": 1, "character": "Buzzy", "credit_...	[{"credit_id": "52fe487dc3a368484e0fb013", "de...
4806	231617	Signed, Sealed, Delivered	"Signed, Sealed, Delivered" introduces a dedic...	[{"id": 35, "name": "Comedy"}, {"id": 18, "nam...	[{"id": 248, "name": "date"}, {"id": 699, "nam...	[{"cast_id": 8, "character": "Oliver O\u2019To...	[{"credit_id": "52fe4df3c3a36847f8275ecf", "de...
4807	126186	Shanghai Calling	When ambitious New York attorney Sam is sent t...	[]	[]	[{"cast_id": 3, "character": "Sam", "credit_id...	[{"credit_id": "52fe4ad9c3a368484e16a36b", "de...
4808	25975	My Date with Drew	Ever since the second grade when he first saw ...	[{"id": 99, "name": "Documentary"}]	[{"id": 1523, "name": "obsession"}, {"id": 224...	[{"cast_id": 3, "character": "Herself", "credi...	[{"credit_id": "58ce021b9251415a390165d9", "de...

4809 rows × 7 columns

In [ ]:
```
### now we have to perform the transformation task

### dataset --> movie_id, title, tag('overview','keywords','release_date','genres','keywords','cast','crew')

### we have to compress the 5 columns in one column, basically it will append data in same column
```

In [15]:
```
### check for null values
movies.isnull().sum()
```

Out[15]:
```
movie_id    0
title       0
overview    3
genres      0
keywords    0
cast        0
crew        0
dtype: int64
```

In [16]:
```
### we got null in overview column. now we will remove rows having null value

movies.dropna(inplace = True)
```

In [17]:
```
movies.isnull().sum()

# now we dont have any missing data
```

```
Out[17]:    movie_id    0
            title       0
            overview    0
            genres      0
            keywords    0
            cast        0
            crew        0
            dtype: int64
```

```
In [18]:  ### check for duplicate

          movies.duplicated().sum()

          # so there are 0 duplicates in data
```

```
Out[18]:  0
```

analyse column by column

Genre

```
In [19]:  movies.iloc[0].genres
```

```
Out[19]:  '[{"id": 28, "name": "Action"}, {"id": 12, "name": "Adventure"}, {"id": 14, "name": "Fantasy"}, {"id": 878, "na
          me": "Science Fiction"}]'
```

```
In [20]:  ### only wanted data from genres [Action, Adventure, Fantasy, Science Fiction]

          def context(obj):
              L = []
              for i in obj:
                  L.append(i['name'])
              return L
```

```
In [21]:  movies['genres'].apply(context)

          ### if we observe closely the output we got in genres is in string datatype so showing error
          ### to overcome it we have to convert it into list
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
Cell In[21], line 1
----> 1 movies['genres'].apply(context)

File ~\anaconda3\Lib\site-packages\pandas\core\series.py:4630, in Series.apply(self, func, convert_dtype, args,
**kwargs)
   4520 def apply(
   4521     self,
   4522     func: AggFuncType,
   (...)
   4525     **kwargs,
   4526 ) -> DataFrame | Series:
   4527     """
   4528     Invoke function on values of Series.
   4529
   (...)
   4628     dtype: float64
   4629     """
-> 4630     return SeriesApply(self, func, convert_dtype, args, kwargs).apply()

File ~\anaconda3\Lib\site-packages\pandas\core\apply.py:1025, in SeriesApply.apply(self)
   1022     return self.apply_str()
   1024 # self.f is Callable
-> 1025 return self.apply_standard()

File ~\anaconda3\Lib\site-packages\pandas\core\apply.py:1076, in SeriesApply.apply_standard(self)
   1074     else:
   1075         values = obj.astype(object)._values
-> 1076         mapped = lib.map_infer(
   1077             values,
   1078             f,
   1079             convert=self.convert_dtype,
   1080         )
   1082 if len(mapped) and isinstance(mapped[0], ABCSeries):
   1083     # GH#43986 Need to do list(mapped) in order to get treated as nested
   1084     #  See also GH#25959 regarding EA support
   1085     return obj._constructor_expanddim(list(mapped), index=obj.index)

File ~\anaconda3\Lib\site-packages\pandas\_libs\lib.pyx:2834, in pandas._libs.lib.map_infer()

Cell In[20], line 6, in context(obj)
      4 L = []
      5 for i in obj:
----> 6     L.append(i['name'])
      7 return L

TypeError: string indices must be integers, not 'str'
```

In [22]:
```python
import ast
### this is used to convert string to list data type

ast.literal_eval('[{"id": 28, "name": "Action"}, {"id": 12, "name": "Adventure"}, {"id": 14, "name": "Fantasy"}
```

Out[22]:
```
[{'id': 28, 'name': 'Action'},
 {'id': 12, 'name': 'Adventure'},
 {'id': 14, 'name': 'Fantasy'},
 {'id': 878, 'name': 'Science Fiction'}]
```

In [23]:
```python
### lets try it with function
def context(obj):
    L = []
    for i in ast.literal_eval(obj):
        L.append(i['name'])
    return L
```

In [24]:
```python
movies['genres'] = movies['genres'].apply(context)
movies['genres']
```

Out[24]:
```
0          [Action, Adventure, Fantasy, Science Fiction]
1                           [Adventure, Fantasy, Action]
2                             [Action, Adventure, Crime]
3                     [Action, Crime, Drama, Thriller]
4                   [Action, Adventure, Science Fiction]
                             ...
4804                         [Action, Crime, Thriller]
4805                                  [Comedy, Romance]
4806                 [Comedy, Drama, Romance, TV Movie]
4807                                                  []
4808                                     [Documentary]
Name: genres, Length: 4806, dtype: object
```

Keywords

In [25]:
```python
movies.iloc[0].keywords

### same scenerio for keywords as well, datatype is in object and we want it in list so we have to follow the s
```

Out[25]: '[{"id": 1463, "name": "culture clash"}, {"id": 2964, "name": "future"}, {"id": 3386, "name": "space war"}, {"id": 3388, "name": "space colony"}, {"id": 3679, "name": "society"}, {"id": 3801, "name": "space travel"}, {"id": 9685, "name": "futuristic"}, {"id": 9840, "name": "romance"}, {"id": 9882, "name": "space"}, {"id": 9951, "name": "alien"}, {"id": 10148, "name": "tribe"}, {"id": 10158, "name": "alien planet"}, {"id": 10987, "name": "cgi"}, {"id": 11399, "name": "marine"}, {"id": 13065, "name": "soldier"}, {"id": 14643, "name": "battle"}, {"id": 14720, "name": "love affair"}, {"id": 165431, "name": "anti war"}, {"id": 193554, "name": "power relations"}, {"id": 206690, "name": "mind and soul"}, {"id": 209714, "name": "3d"}]'

In [26]:
```python
def key_context(obj):
    k=[]
    for i in ast.literal_eval(obj):
        k.append(i['name'])
    return k
```

In [27]:
```python
movies['keywords'] = movies['keywords'].apply(key_context)
```

In [28]:
```python
movies['keywords']
```

Out[28]:
```
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...
                              ...
4804    [united states–mexico barrier, legs, arms, pap...
4805                                                   []
4806    [date, love at first sight, narration, investi...
4807                                                   []
4808          [obsession, camcorder, crush, dream girl]
Name: keywords, Length: 4806, dtype: object
```

In [29]:
```python
movies
```

Out[29]:

	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...
...	...	...	...	...	...	...	...
4804	9367	El Mariachi	El Mariachi just wants to play his guitar and ...	[Action, Crime, Thriller]	[united states–mexico barrier, legs, arms, pap...	[{"cast_id": 1, "character": "El Mariachi", "c...	[{"credit_id": "52fe44eec3a36847f80b280b", "de...
4805	72766	Newlyweds	A newlywed couple's honeymoon is upended by th...	[Comedy, Romance]	[]	[{"cast_id": 1, "character": "Buzzy", "credit_...	[{"credit_id": "52fe487dc3a368484e0fb013", "de...
4806	231617	Signed, Sealed, Delivered	"Signed, Sealed, Delivered" introduces a dedic...	[Comedy, Drama, Romance, TV Movie]	[date, love at first sight, narration, investi...	[{"cast_id": 8, "character": "Oliver O\u2019To...	[{"credit_id": "52fe4df3c3a36847f8275ecf", "de...
4807	126186	Shanghai Calling	When ambitious New York attorney Sam is sent t...	[]	[]	[{"cast_id": 3, "character": "Sam", "credit_id...	[{"credit_id": "52fe4ad9c3a368484e16a36b", "de...
4808	25975	My Date with Drew	Ever since the second grade when he first saw ...	[Documentary]	[obsession, camcorder, crush, dream girl]	[{"cast_id": 3, "character": "Herself", "credi...	[{"credit_id": "58ce021b9251415a390165d9", "de...

4806 rows × 7 columns

cast

In [30]:
```python
movies.iloc[0].cast
```

Out[30]:
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```python
In [31]:  def cast_context(obj):
              c=[]
              counter = 0
              for i in ast.literal_eval(obj):
                  if counter < 3:
                      c.append(i['name'])
                      counter+=1
                  else:
                      break
              return c
```

```python
In [32]:  movies['cast']=movies['cast'].apply(cast_context)
```

```python
In [33]:  movies['cast']
```

```
Out[33]:  0          [Sam Worthington, Zoe Saldana, Sigourney Weaver]
          1             [Johnny Depp, Orlando Bloom, Keira Knightley]
          2             [Daniel Craig, Christoph Waltz, Léa Seydoux]
          3             [Christian Bale, Michael Caine, Gary Oldman]
          4          [Taylor Kitsch, Lynn Collins, Samantha Morton]
                                      ...
          4804    [Carlos Gallardo, Jaime de Hoyos, Peter Marqua...
          4805          [Edward Burns, Kerry Bishé, Marsha Dietlein]
          4806           [Eric Mabius, Kristin Booth, Crystal Lowe]
          4807           [Daniel Henney, Eliza Coupe, Bill Paxton]
          4808    [Drew Barrymore, Brian Herzlinger, Corey Feldman]
          Name: cast, Length: 4806, dtype: object
```

```python
In [34]:  movies
```

	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 Weaver]	[{"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]	[{"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]	[{"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...
...	...	...	...	...	...	...	...
4804	9367	El Mariachi	El Mariachi just wants to play his guitar and ...	[Action, Crime, Thriller]	[united states–mexico barrier, legs, arms, pap...	[Carlos Gallardo, Jaime de Hoyos, Peter Marqua...	[{"credit_id": "52fe44eec3a36847f80b280b", "de...
4805	72766	Newlyweds	A newlywed couple's honeymoon is upended by th...	[Comedy, Romance]	[]	[Edward Burns, Kerry Bishé, Marsha Dietlein]	[{"credit_id": "52fe487dc3a368484e0fb013", "de...
4806	231617	Signed, Sealed, Delivered	"Signed, Sealed, Delivered" introduces a dedic...	[Comedy, Drama, Romance, TV Movie]	[date, love at first sight, narration, investi...	[Eric Mabius, Kristin Booth, Crystal Lowe]	[{"credit_id": "52fe4df3c3a36847f8275ecf", "de...
4807	126186	Shanghai Calling	When ambitious New York attorney Sam is sent t...	[]	[]	[Daniel Henney, Eliza Coupe, Bill Paxton]	[{"credit_id": "52fe4ad9c3a368484e16a36b", "de...
4808	25975	My Date with Drew	Ever since the second grade when he first saw ...	[Documentary]	[obsession, camcorder, crush, dream girl]	[Drew Barrymore, Brian Herzlinger, Corey Feldman]	[{"credit_id": "58ce021b9251415a390165d9", "de...

4806 rows × 7 columns

crew

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In [35]: movies.iloc[0].crew
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In [36]:
```python
def crew_context(obj):
    cr = []

    # not working for me
    # for i in ast.literal_eval(obj):
    #     if i['job'] == "Director":
    #         cr.append(i['name'])
    #     return cr

    for i in ast.literal_eval(obj):
        cr.append(i['name'])
```

```
          return cr
```

In [37]:
```
movies['crew']=movies['crew'].apply(crew_context)
```

In [38]:
```
movies['crew']
```

Out[38]:
```
0       [Stephen E. Rivkin, Rick Carter, Christopher B...
1       [Dariusz Wolski, Gore Verbinski, Jerry Bruckhe...
2       [Thomas Newman, Sam Mendes, Anna Pinnock, John...
3       [Hans Zimmer, Charles Roven, Christopher Nolan...
4       [Andrew Stanton, Andrew Stanton, John Lasseter...
                              ...
4804    [Robert Rodriguez, Robert Rodriguez, Robert Ro...
4805    [Edward Burns, Edward Burns, Edward Burns, Wil...
4806    [Carla Hetland, Harvey Kahn, Adam Sliwinski, M...
4807                          [Daniel Hsia, Daniel Hsia]
4808    [Clark Peterson, Andrew Reimer, Brian Herzling...
Name: crew, Length: 4806, dtype: object
```

In [39]:
```
movies
```

Out[39]:

	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 Weaver]	[Stephen E. Rivkin, Rick Carter, Christopher B...
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]	[Dariusz Wolski, Gore Verbinski, Jerry Bruckhe...
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]	[Thomas Newman, Sam Mendes, Anna Pinnock, John...
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]	[Hans Zimmer, Charles Roven, Christopher Nolan...
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]	[Andrew Stanton, Andrew Stanton, John Lasseter...
...	...	...	...	...	...	...	...
4804	9367	El Mariachi	El Mariachi just wants to play his guitar and ...	[Action, Crime, Thriller]	[united states–mexico barrier, legs, arms, pap...	[Carlos Gallardo, Jaime de Hoyos, Peter Marqua...	[Robert Rodriguez, Robert Rodriguez, Robert Ro...
4805	72766	Newlyweds	A newlywed couple's honeymoon is upended by th...	[Comedy, Romance]	[]	[Edward Burns, Kerry Bishé, Marsha Dietlein]	[Edward Burns, Edward Burns, Edward Burns, Wil...
4806	231617	Signed, Sealed, Delivered	"Signed, Sealed, Delivered" introduces a dedic...	[Comedy, Drama, Romance, TV Movie]	[date, love at first sight, narration, investi...	[Eric Mabius, Kristin Booth, Crystal Lowe]	[Carla Hetland, Harvey Kahn, Adam Sliwinski, M...
4807	126186	Shanghai Calling	When ambitious New York attorney Sam is sent t...	[]	[]	[Daniel Henney, Eliza Coupe, Bill Paxton]	[Daniel Hsia, Daniel Hsia]
4808	25975	My Date with Drew	Ever since the second grade when he first saw ...	[Documentary]	[obsession, camcorder, crush, dream girl]	[Drew Barrymore, Brian Herzlinger, Corey Feldman]	[Clark Peterson, Andrew Reimer, Brian Herzling...

4806 rows × 7 columns

In [ ]:
```
### Now we will be removing the space present in names of columns genres, keywords, cast, crew
### becasue there are many first or last name whcih are similar to other names, which can create confusion
### while running the model.
```

In [40]:
```
def merg_name(obj):
    n = []
    for i in obj:
        n.append(i.replace(" ",""))
    return n
```

In [41]:
```
movies['keywords']=movies['keywords'].apply(merg_name)
movies['genres']=movies['genres'].apply(merg_name)
movies['cast']=movies['cast'].apply(merg_name)
movies['crew']=movies['crew'].apply(merg_name)
```

In [42]:
```
movies
```

	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]	[StephenE.Rivkin, RickCarter, ChristopherBoyes...
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]	[DariuszWolski, GoreVerbinski, JerryBruckheime...
2	206647	Spectre	A cryptic message from Bond's past sends him o...	[Action, Adventure, Crime]	[spy, basedonnovel, secretagent, sequel, mi6, ...	[DanielCraig, ChristophWaltz, LéaSeydoux]	[ThomasNewman, SamMendes, AnnaPinnock, JohnLog...
3	49026	The Dark Knight Rises	Following the death of District Attorney Harve...	[Action, Crime, Drama, Thriller]	[dccomics, crimefighter, terrorist, secretiden...	[ChristianBale, MichaelCaine, GaryOldman]	[HansZimmer, CharlesRoven, ChristopherNolan, C...
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, AndrewStanton, JohnLasseter, C...
...	...	...	...	...	...	...	...
4804	9367	El Mariachi	El Mariachi just wants to play his guitar and ...	[Action, Crime, Thriller]	[unitedstates–mexicobarrier, legs, arms, paper...	[CarlosGallardo, JaimedeHoyos, PeterMarquardt]	[RobertRodriguez, RobertRodriguez, RobertRodri...
4805	72766	Newlyweds	A newlywed couple's honeymoon is upended by th...	[Comedy, Romance]	[]	[EdwardBurns, KerryBishé, MarshaDietlein]	[EdwardBurns, EdwardBurns, EdwardBurns, Willia...
4806	231617	Signed, Sealed, Delivered	"Signed, Sealed, Delivered" introduces a dedic...	[Comedy, Drama, Romance, TVMovie]	[date, loveatfirstsight, narration, investigat...	[EricMabius, KristinBooth, CrystalLowe]	[CarlaHetland, HarveyKahn, AdamSliwinski, Mart...
4807	126186	Shanghai Calling	When ambitious New York attorney Sam is sent t...	[]	[]	[DanielHenney, ElizaCoupe, BillPaxton]	[DanielHsia, DanielHsia]
4808	25975	My Date with Drew	Ever since the second grade when he first saw ...	[Documentary]	[obsession, camcorder, crush, dreamgirl]	[DrewBarrymore, BrianHerzlinger, CoreyFeldman]	[ClarkPeterson, AndrewReimer, BrianHerzlinger,...

4806 rows × 7 columns

In [ ]:
```
### Now we will add a'Tag' column in which we will merge
### for that we need overview column, but overview is in string . we have to convert it into list
```

In [43]:
```
movies['overview'] = movies['overview'].apply(lambda x : x.split())
```

In [44]:
```
movies.head()

### with the help of split overview got converted into list
```

Out[44]:

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

In [45]:
```
movies['Tag'] = movies['overview']+movies['keywords']+movies['genres']+movies['cast']+movies['crew']
```

In [46]:
```
movies.iloc[0].Tag
### we have all below words in Tag, now we dont need columns which are merged in Tag column,
### so we will delete them
```

Out[46]:
```
['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.',
'cultureclash',
'future',
'spacewar',
'spacecolony',
'society',
'spacetravel',
'futuristic',
'romance',
'space',
'alien',
'tribe',
'alienplanet',
'cgi',
'marine',
'soldier',
'battle',
'loveaffair',
'antiwar',
'powerrelations',
'mindandsoul',
'3d',
'Action',
'Adventure',
'Fantasy',
'ScienceFiction',
'SamWorthington',
'ZoeSaldana',
'SigourneyWeaver',
'StephenE.Rivkin',
'RickCarter',
'ChristopherBoyes',
'ChristopherBoyes',
'MaliFinn',
'JamesHorner',
'JamesCameron',
'JamesCameron',
'JamesCameron',
'JamesCameron',
'JamesCameron',
'AndrewMenzies',
'JillBrooks',
'MargerySimkin',
'KevinIshioka',
'DickBernstein',
'ShannonMills',
'DennieThorpe',
'JanaVance',
'DeborahLynnScott',
'JonLandau',
'SeanHaworth',
'KimSinclair',
'KimSinclair',
'RichardF.Mays',
'LaetaKalogridis',
'MayesC.Rubeo',
'MauroFiore',
'ScottHerbertson',
'WoodySchultz',
'LindaDeVetta',
'LindaDeVetta',
'RichardBluck',
'SimonBright',
'RichardMartin',
'SteveR.Moore',
'JohnRefoua',
'KarlJ.Martin',
'ChilingLin',
'IlramChoi',
'StevenQuale',
'CarlaMeyer',
'NickBassett',
'JillCormack',
```

```
'AndyMcLaren',
'TerryNotary',
'GarrettWarren',
'JonathanRothbart',
'StefanDechant',
'ToddCherniawsky',
'MirandaRivers',
'RobertStromberg',
'JohnHarding',
'RobertoDeAngelis',
'MikeSmithson',
'AlainLalanne',
'LucasSalton',
'JanaceTashjian',
'StephenRosenbaum',
'FrankieKarena',
'LisaLovaas',
'JonathanFawkner',
'RobertBavin',
'AnthonyAlmaraz',
'CarolynM.Fenton',
'BethKoenigsberg',
'SamPage',
'TexKadonaga',
'KimFoscato',
'TammyS.Lee',
'DennyCaira',
'JamesWaitkus',
'AddisonTeague',
'C.ScottBaker',
'LukeCaska',
'DavidChow',
'JonathanDyer',
'JosephHiura',
'RebeccaJellie',
'RobertAndrewJohnson',
'MikeStassi',
'JohnVillarino',
'JeffreyWisniewski',
'CherylNardi',
'MarshallWinn',
'GwendolynYatesWhittle',
'WilliamStein',
'LulaWashington',
'ChrisDelConte',
'R.ChristopherWhite',
'DanLemmon',
'TimNielsen',
'MichaelMulholland',
'ThomasNittmann',
'EdsonWilliams',
'ChristineCarr',
'JohnBruno',
'DavidEmmerichs',
'ChristopherScarabosio',
'JenniferTeves',
'BrigitteYorke',
'KenFischer',
'IainHutton',
'SteveIngram',
'JoyceCox',
'JennyFoster',
'ChristopherMarino',
'JimMilton',
'CyndiOchs',
'LucasPutnam',
"Anthony'Max'Ivins",
'JohnKnoll',
'EricSaindon',
'WayneStables',
'DavidStinnett',
'GuyWilliams',
'StuartThorp',
'GilesCoburn',
'MarkFellman',
'ScottSprague',
'JeremyHollobon',
'OrlandoMeunier',
'TaisukeTanimura',
'LiliaMishelAcevedo',
'AlejandroM.Hernandez',
'MarvinHall',
'JudyAlley',
'MikePerry',
'AndrewMorley',
'SethEngstrom',
'EricOliver',
'MatsuneSuzuki',
'PaulTobin',
```

```
    'RoxaneGriffin',
    'ArunRam-Mohan',
    'GeorgiaLockhart-Adams',
    'ThrainShadbolt',
    'BradAlexander',
    'ShadiAlmassizadeh',
    'SimonClutterbuck',
    'GraemeDemmocks',
    'AdrianFernandes',
    'MitchGates',
    'JerryKung',
    'AndyLomas',
    'SebastianMarino',
    'MatthiasMenz',
    'SergeiNevshupov',
    'PhilippeRebours',
    'MichaelTakarangi',
    'DavidWeitzberg',
    'BenWhite',
    'MinWindle']
```

In [47]:
```python
new_movie_data = movies.drop(columns=['overview',"keywords",'cast','crew','genres'])
```

In [48]:
```python
new_movie_data
```

Out[48]:

	movie_id	title	Tag
0	19995	Avatar	[In, the, 22nd, century,, a, paraplegic, Marin...
1	285	Pirates of the Caribbean: At World's End	[Captain, Barbossa,, long, believed, to, be, d...
2	206647	Spectre	[A, cryptic, message, from, Bond's, past, send...
3	49026	The Dark Knight Rises	[Following, the, death, of, District, Attorney...
4	49529	John Carter	[John, Carter, is, a, war-weary,, former, mili...
...	...	...	...
4804	9367	El Mariachi	[El, Mariachi, just, wants, to, play, his, gui...
4805	72766	Newlyweds	[A, newlywed, couple's, honeymoon, is, upended...
4806	231617	Signed, Sealed, Delivered	["Signed,, Sealed,, Delivered", introduces, a,...
4807	126186	Shanghai Calling	[When, ambitious, New, York, attorney, Sam, is...
4808	25975	My Date with Drew	[Ever, since, the, second, grade, when, he, fi...

4806 rows × 3 columns

In [49]:
```python
### Tag is in list so we have to convert it back to string
new_movie_data['Tag'] = new_movie_data["Tag"].apply(lambda x : " ".join(x))
```

In [50]:
```python
new_movie_data # it has 2 commas in between
```

Out[50]:

	movie_id	title	Tag
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...
...	...	...	...
4804	9367	El Mariachi	El Mariachi just wants to play his guitar and ...
4805	72766	Newlyweds	A newlywed couple's honeymoon is upended by th...
4806	231617	Signed, Sealed, Delivered	"Signed, Sealed, Delivered" introduces a dedic...
4807	126186	Shanghai Calling	When ambitious New York attorney Sam is sent t...
4808	25975	My Date with Drew	Ever since the second grade when he first saw ...

4806 rows × 3 columns

In [51]:
```python
new_movie_data.iloc[0].Tag
```

"In the 22nd century, a paraplegic Marine is dispatched to the moon Pandora on a unique mission, but becomes to
rn between following orders and protecting an alien civilization. cultureclash future spacewar spacecolony soci
ety spacetravel futuristic romance space alien tribe alienplanet cgi marine soldier battle loveaffair antiwar p
owerrelations mindandsoul 3d Action Adventure Fantasy ScienceFiction SamWorthington ZoeSaldana SigourneyWeaver
StephenE.Rivkin RickCarter ChristopherBoyes ChristopherBoyes MaliFinn JamesHorner JamesCameron JamesCameron Jam
esCameron JamesCameron JamesCameron AndrewMenzies JillBrooks MargerySimkin KevinIshioka DickBernstein ShannonMi
lls DennieThorpe JanaVance DeborahLynnScott JonLandau SeanHaworth KimSinclair KimSinclair RichardF.Mays LaetaKa
logridis MayesC.Rubeo MauroFiore ScottHerbertson WoodySchultz LindaDeVetta LindaDeVetta RichardBluck SimonBrigh
t RichardMartin SteveR.Moore JohnRefoua KarlJ.Martin ChilingLin IlramChoi StevenQuale CarlaMeyer NickBassett Ji
llCormack AndyMcLaren TerryNotary GarrettWarren JonathanRothbart StefanDechant ToddCherniawsky MirandaRivers Ro
bertStromberg JohnHarding RobertoDeAngelis MikeSmithson AlainLalanne LucasSalton JanaceTashjian StephenRosenbau
m FrankieKarena LisaLovaas JonathanFawkner RobertBavin AnthonyAlmaraz CarolynM.Fenton BethKoenigsberg SamPage T
exKadonaga KimFoscato TammyS.Lee DennyCaira JamesWaitkus AddisonTeague C.ScottBaker LukeCaska DavidChow Jonatha
nDyer JosephHiura RebeccaJellie RobertAndrewJohnson MikeStassi JohnVillarino JeffreyWisniewski CherylNardi Mars
hallWinn GwendolynYatesWhittle WilliamStein LulaWashington ChrisDelConte R.ChristopherWhite DanLemmon TimNielse
n MichaelMulholland ThomasNittmann EdsonWilliams ChristineCarr JohnBruno DavidEmmerichs ChristopherScarabosio J
enniferTeves BrigitteYorke KenFischer IainHutton SteveIngram JoyceCox JennyFoster ChristopherMarino JimMilton C
yndiOchs LucasPutnam Anthony'Max'Ivins JohnKnoll EricSaindon WayneStables DavidStinnett GuyWilliams StuartThorp
GilesCoburn MarkFellman ScottSprague JeremyHollobon OrlandoMeunier TaisukeTanimura LiliaMishelAcevedo Alejandro
M.Hernandez MarvinHall JudyAlley MikePerry AndrewMorley SethEngstrom EricOliver MatsuneSuzuki PaulTobin RoxaneG
riffin ArunRam-Mohan GeorgiaLockhart-Adams ThrainShadbolt BradAlexander ShadiAlmassizadeh SimonClutterbuck Grae
meDemmocks AdrianFernandes MitchGates JerryKung AndyLomas SebastianMarino MatthiasMenz SergeiNevshupov Philippe
Rebours MichaelTakarangi DavidWeitzberg BenWhite MinWindle"

word to vector

embedding

- for example:
- if I have Man, Women, Dog and asked to take out 2 similar words, in such what can be the amswer
- Man and Women
- we can easily identify the difference but we have to make computer as well to do that.
- in such case **embedding** comes into picture
- we know that computer can understand in much better way if we can give input in numbers.

```
# for example let's give some random vector to Man, Women, Dog
man - [1,1,1,0,2]
women - [1,1,1,3,2]
dog - [10,34,12,0,0]

# so if we ask machine which 2 words are similar by observing all 3 vector machine can say man and women
# this is word to vector
```

how will be performing this --> BOW (bag of words)

```
# lets say we want to check the sentiments

i loved it | positive
i hated it | negative
i like it | positve
```

```
# so first it will take out the vocabulary - i.e. unique words (BOW)

[i, loved, it, hated, like]
# now this vacabulary will become features
```

```
# features
# which word is present in sentence give 1 else 0
           i. loved. it. hated. like
sentence_1 1   1      1   0       0
sentence_2 1   0      1   1       0
sentence_3 1   0      1   0       1

# now we converted sentence to vector, this is what we are trying to do
# whatever words we have in Tag field we will convert them into vector
```

In [52]:
```
# now we will import word to vector liabrary

from sklearn.feature_extraction.text import CountVectorizer
```

In [53]:
```
cv = CountVectorizer(max_features = 10000)

# maxfeature = in above 3 statements we got max 5 features, so as per our data there can be many features but
# for now we have considered take 10000 features not more then that.
```

In [54]:
```
vector = cv.fit_transform(new_movie_data['Tag']).toarray()
```

In [55]:
```
vector  #this is how the vector data looks like
```

```
Out[55]:  array([[0, 0, 0, ..., 0, 0, 0],
                 [0, 0, 0, ..., 0, 0, 0],
                 [0, 0, 0, ..., 0, 0, 0],
                 ...,
                 [0, 0, 0, ..., 0, 0, 0],
                 [0, 0, 0, ..., 0, 0, 0],
                 [0, 0, 0, ..., 0, 0, 0]], dtype=int64)
```

```
In [56]:  vector.shape
```

```
Out[56]:  (4806, 10000)
```

how it will find similarity --> cosine similarity

```
In [57]:  from sklearn.metrics.pairwise import cosine_similarity
```

```
In [58]:  #for example to test
          # cosine always needs data in 2D, so data is given inside double bracket

          man = np.array([[10,20,10,10]])
          women = np.array([[10,15,10,10]])
          dog = np.array([[100,15,22,20]])
          boy = np.array([[10,20,10,10]])
```

```
In [59]:  cosine_similarity(man, women)

          # 98% similarity
```

```
Out[59]:  array([[0.98974332]])
```

```
In [60]:  cosine_similarity(women, dog)
          # 68% similarity
```

```
Out[60]:  array([[0.68115942]])
```

```
In [61]:  cosine_similarity(man, dog)
          # 61% similarity
```

```
Out[61]:  array([[0.61679656]])
```

```
In [62]:  # if data is 100% similar
          cosine_similarity(man, boy)
```

```
Out[62]:  array([[1.]])
```

```
In [63]:  # now if we apply it on actual data

          similarity = cosine_similarity(vector)
```

```
In [64]:  similarity
```

```
Out[64]:  array([[1.        , 0.15365907, 0.09130823, ..., 0.14935187, 0.11651035,
                  0.08738276],
                 [0.15365907, 1.        , 0.17771762, ..., 0.22224556, 0.25064021,
                  0.15515822],
                 [0.09130823, 0.17771762, 1.        , ..., 0.20335959, 0.15071001,
                  0.14066268],
                 ...,
                 [0.14935187, 0.22224556, 0.20335959, ..., 1.        , 0.3425257 ,
                  0.20759133],
                 [0.11651035, 0.25064021, 0.15071001, ..., 0.3425257 , 1.        ,
                  0.28205128],
                 [0.08738276, 0.15515822, 0.14066268, ..., 0.20759133, 0.28205128,
                  1.        ]])
```

```
In [65]:  similarity.shape
```

```
Out[65]:  (4806, 4806)
```

```
In [ ]:   # so the machine is trying to create a box and trying to compare it with each sentence
                      sent_1    sent_2    sent_3
          sent_1        1         0         0
          sent_2        0         1         0
          sent_3        0         0         1
          # if there is any similarity in sentence_1 with other sentences then it will show how much % of similarity is t
```

```
In [66]:  def recommend(movie):
              index = new_movie_data[new_movie_data['title'] == movie].index[0]
              distances = sorted(list(enumerate(similarity[index])),reverse=True, key = lambda x:x[1])
              print(distances)
              for i in distances[1:6]:
          #        print(new_movie_data.iloc[i[0]].title)
                  pass
```

```
In [67]: # let's understand line by line

         #### index = new_movie_data[new_movie_data['title'] == movie].index[0]

         #this line will scan whole data and compare it with the name we have given in movie and it will provide index f
         # index is important for us
         new_movie_data[new_movie_data['title'] == 'Gandhi'] #this is how it will give the output
```

Out[67]:

	movie_id	title	Tag
2030	783	Gandhi	In the early years of the 20th century, Mohand...

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

        # we taking the similarity variable which is basically a square matrix and inside that we are giving the index
        # we got on first line explanation, then we are arranging it in descending order to get the most similar % of m
        # with the index 2030
        # then we are doing a collab with enumerate so it gives index to all the % we are getting
        # now what lambda is doing, it is taking the index of all the data
```

```
In [68]: sorted(similarity[2030],reverse = True)
```

Out[68]:
```
[1.0,
 0.5493274114646123,
 0.5104812758612466,
 0.5030977485864635,
 0.4994391348697552,
 0.4928053803045812,
 0.49253182747733903,
 0.48763326991479866,
 0.4860169569321385,
 0.4832852663179642,
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In [ ]:
```python
#### for i in distances[1:6]
     # print(new_movie_data.iloc[i[0]].title)

# for loop is taking top six indexes of most near % to the movie
# it will one by one iterate the index from top 6 and provide the title for the same
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In [69]:
```python
recommend('Gandhi')

# just for observation we can see that each % is having some index
# from extracting this index of particular we get to know the title of movie
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4278, 0.0), (4405, 0.0), (4516, 0.0)]

In [71]:
```python
def recommend(movie):
    index = new_movie_data[new_movie_data['title'] == movie].index[0]
    distances = sorted(list(enumerate(similarity[index])),reverse=True, key = lambda x:x[1])
    for i in distances[1:6]:
        print(new_movie_data.iloc[i[0]].title)
```

In [72]:
```python
recommend('Gandhi')
```

```
Guiana 1838
1776
Winter in Wartime
Hart's War
End of the Spear
```

In [73]:
```python
recommend('Batman Begins')
```

```
The Dark Knight
The Dark Knight Rises
Ironclad
The Midnight Meat Train
Gladiator
```

In [ ]: