Movie_Studio_P1_Project_HK

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- Student pace: full time
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- Blog post URL:

Overview

This project analyzes the most popular, top movies which will be preffered to make a film in a new studio business of Microsoft. Descriptive analysis of movies shows that the relationship among release date, worldwide gross and ratings in imbd records. Microsoft can use this analysis to adjust new movie category, when it should be launched to improve their new studio business.

Business Problem

Microsoft may be able to improve their resource allocation to get more turnover in the correct season with three categories of movies. Preferring these movies aims more satisfied audience thanks to the high demanded movies while company is going to get anticipated turnover.

Data Understanding

Miscrosoft has the most huge public dataset of movies, ratings, years, release years and more. Every movie category has a unique ID associated with both their names, dates, rating, budget data. The data files provide the dates and types of each movie, as well as other movies characteristics (e.g. type, release date, ratings etc).

In [73]:

```
import pandas as pd
import sqlite3
```

In [74]:
```
tn_movie = pd.read_csv('zippedData/tn.movie_budgets.csv.gz')
tn_movie.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5782 entries, 0 to 5781
Data columns (total 6 columns):
 #   Column             Non-Null Count  Dtype 
---  ------             --------------  ----- 
 0   id                 5782 non-null   int64 
 1   release_date       5782 non-null   object
 2   movie              5782 non-null   object
 3   production_budget  5782 non-null   object
 4   domestic_gross     5782 non-null   object
 5   worldwide_gross    5782 non-null   object
dtypes: int64(1), object(5)
memory usage: 271.2+ KB
```

In [75]:
```
tn_movie.columns
```

Out[75]:
```
Index(['id', 'release_date', 'movie', 'production_budget', 'domestic_
gross',
       'worldwide_gross'],
      dtype='object')
```

In [76]:
```
tn_movie.head()
```

Out[76]:

	id	release_date	movie	production_budget	domestic_gross	worldwide_gross
0	1	Dec 18, 2009	Avatar	$425,000,000	$760,507,625	$2,776,345,279
1	2	May 20, 2011	Pirates of the Caribbean: On Stranger Tides	$410,600,000	$241,063,875	$1,045,663,875
2	3	Jun 7, 2019	Dark Phoenix	$350,000,000	$42,762,350	$149,762,350
3	4	May 1, 2015	Avengers: Age of Ultron	$330,600,000	$459,005,868	$1,403,013,963
4	5	Dec 15, 2017	Star Wars Ep. VIII: The Last Jedi	$317,000,000	$620,181,382	$1,316,721,747

In [78]:
```
tn_movie.shape
```

Out[78]:
```
(5782, 6)
```

In [79]:
```
tn_movie['movie'].sort_index(ascending=True)
```

Out[79]:
```
0                                              Avatar
1         Pirates of the Caribbean: On Stranger Tides
2                                        Dark Phoenix
3                             Avengers: Age of Ultron
4                   Star Wars Ep. VIII: The Last Jedi
                            ...                      
5777                                           Red 11
5778                                        Following
5779                    Return to the Land of Wonders
5780                             A Plague So Pleasant
5781                                My Date With Drew
Name: movie, Length: 5782, dtype: object
```

In [80]:
```
tn_movie['worldwide_gross'].sort_index(ascending=True)
```

Out[80]:
```
0       $2,776,345,279
1       $1,045,663,875
2         $149,762,350
3       $1,403,013,963
4       $1,316,721,747
             ...      
5777                $0
5778          $240,495
5779            $1,338
5780                $0
5781          $181,041
Name: worldwide_gross, Length: 5782, dtype: object
```

In [81]:
```
tmdb_movie = pd.read_csv('zippedData/tmdb.movies.csv.gz')
tmdb_movie.head()
```

Out[81]:

	Unnamed: 0	genre_ids	id	original_language	original_title	popularity	release_date	ti
0	0	[12, 14, 10751]	12444	en	Harry Potter and the Deathly Hallows: Part 1	33.533	2010-11-19	Ha Pot and t Deat Hallov Par
1	1	[14, 12, 16, 10751]	10191	en	How to Train Your Dragon	28.734	2010-03-26	How Tr Yo Drag
2	2	[12, 28, 878]	10138	en	Iron Man 2	28.515	2010-05-07	Iron M
3	3	[16, 35, 10751]	862	en	Toy Story	28.005	1995-11-22	T Sto
4	4	[28, 878, 12]	27205	en	Inception	27.920	2010-07-16	Incepti

In [82]:
```
conn = sqlite3.connect('zippedData/im.db')
```

In [83]:
```
movie_ratings = pd.read_sql("""

SELECT *
FROM movie_ratings



""", conn)
movie_ratings.head(10)
```

Out[83]:

	movie_id	averagerating	numvotes
0	tt10356526	8.3	31
1	tt10384606	8.9	559
2	tt1042974	6.4	20
3	tt1043726	4.2	50352
4	tt1060240	6.5	21
5	tt1069246	6.2	326
6	tt1094666	7.0	1613
7	tt1130982	6.4	571
8	tt1156528	7.2	265
9	tt1161457	4.2	148

In [84]:
```
movie_ratings.shape
```

Out[84]:
```
(73856, 3)
```

In [85]:
```
movie_ratings.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 73856 entries, 0 to 73855
Data columns (total 3 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   movie_id       73856 non-null  object 
 1   averagerating  73856 non-null  float64
 2   numvotes       73856 non-null  int64  
dtypes: float64(1), int64(1), object(1)
memory usage: 1.7+ MB
```

In [86]:
```
movie_basics = pd.read_sql("""

SELECT *
FROM movie_basics


""", conn)
movie_basics.head(10)
```

Out[86]:

	movie_id	primary_title	original_title	start_year	runtime_minutes	genres
0	tt0063540	Sunghursh	Sunghursh	2013	175.0	Action,Crime,Drama
1	tt0066787	One Day Before the Rainy Season	Ashad Ka Ek Din	2019	114.0	Biography,Drama
2	tt0069049	The Other Side of the Wind	The Other Side of the Wind	2018	122.0	Drama
3	tt0069204	Sabse Bada Sukh	Sabse Bada Sukh	2018	NaN	Comedy,Drama
4	tt0100275	The Wandering Soap Opera	La Telenovela Errante	2017	80.0	Comedy,Drama,Fantasy
5	tt0111414	A Thin Life	A Thin Life	2018	75.0	Comedy
6	tt0112502	Bigfoot	Bigfoot	2017	NaN	Horror,Thriller
7	tt0137204	Joe Finds Grace	Joe Finds Grace	2017	83.0	Adventure,Animation,Comedy
8	tt0139613	O Silêncio	O Silêncio	2012	NaN	Documentary,History
9	tt0144449	Nema aviona za Zagreb	Nema aviona za Zagreb	2012	82.0	Biography

In [87]:
```
movie_basics.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 146144 entries, 0 to 146143
Data columns (total 6 columns):
 #   Column           Non-Null Count   Dtype  
---  ------           --------------   -----  
 0   movie_id         146144 non-null  object 
 1   primary_title    146144 non-null  object 
 2   original_title   146123 non-null  object 
 3   start_year       146144 non-null  int64  
 4   runtime_minutes  114405 non-null  float64
 5   genres           140736 non-null  object 
dtypes: float64(1), int64(1), object(4)
memory usage: 6.7+ MB
```

Merging Dataset (movie_basics & movie_ratings)

In [88]:
```
# Merge movie_basics and movie_ratings on movie_id

movie_bas_rat = pd.merge(movie_basics,
                         movie_ratings,
                         on=['movie_id'],
                         how='inner')
```

In [89]:
```
movie_bas_rat
```

Out[89]:

	movie_id	primary_title	original_title	start_year	runtime_minutes	genres
0	tt0063540	Sunghursh	Sunghursh	2013	175.0	Action,Crime,Drama
1	tt0066787	One Day Before the Rainy Season	Ashad Ka Ek Din	2019	114.0	Biography,Drama
2	tt0069049	The Other Side of the Wind	The Other Side of the Wind	2018	122.0	Drama
3	tt0069204	Sabse Bada Sukh	Sabse Bada Sukh	2018	NaN	Comedy,Drama
4	tt0100275	The Wandering Soap Opera	La Telenovela Errante	2017	80.0	Comedy,Drama,Fantasy
...	...	...	...	...	...	...
73851	tt9913084	Diabolik sono io	Diabolik sono io	2019	75.0	Documentary
73852	tt9914286	Sokagin Çocuklari	Sokagin Çocuklari	2019	98.0	Drama,Family
73853	tt9914642	Albatross	Albatross	2017	NaN	Documentary
73854	tt9914942	La vida sense la Sara Amat	La vida sense la Sara Amat	2019	NaN	None
73855	tt9916160	Drømmeland	Drømmeland	2019	72.0	Documentary

73856 rows × 8 columns

In [90]:
```
movie_bas_rat.head()
```

Out[90]:

	movie_id	primary_title	original_title	start_year	runtime_minutes	genres	ave
0	tt0063540	Sunghursh	Sunghursh	2013	175.0	Action,Crime,Drama	
1	tt0066787	One Day Before the Rainy Season	Ashad Ka Ek Din	2019	114.0	Biography,Drama	
2	tt0069049	The Other Side of the Wind	The Other Side of the Wind	2018	122.0	Drama	
3	tt0069204	Sabse Bada Sukh	Sabse Bada Sukh	2018	NaN	Comedy,Drama	
4	tt0100275	The Wandering Soap Opera	La Telenovela Errante	2017	80.0	Comedy,Drama,Fantasy	

In [91]:
```
movie_bas_rat['primary_title'].nunique()
```

Out[91]:
```
69993
```

In [92]:
```
movie_bas_rat['original_title'].nunique()
```

Out[92]:
```
71097
```

In [93]:
```
movie_bas_rat.shape
```

Out[93]:
```
(73856, 8)
```

In [94]:
```
movie_bas_rat['movie_id'].nunique()
```

Out[94]:
```
73856
```

In [95]:
```
tn_movie['movie'].nunique()
```

Out[95]:
```
5698
```

In [96]:
```
tn_movie.shape
```

Out[96]:
```
(5782, 6)
```

Eliminated duplicate columns

In [97]:
```
# eliminated duplicate columns

movie_bas_rat.drop_duplicates(['primary_title'], inplace=True)
```

In [98]:
```
movie_bas_rat.shape
```

Out[98]:
```
(69993, 8)
```

In [99]:
```
# eliminated duplicate columns

tn_movie.drop_duplicates(['movie'], inplace=True)
```

In [100]:
```
tn_movie.shape
```

Out[100]:
```
(5698, 6)
```

Merging Dataset (movie_bas_rat & tn_movie)

In [101]:
```
# Merged movie_bas_rat and tn_movie on primary_title & movie

mov_bas_rat2 = pd.merge(movie_bas_rat,
                        tn_movie,
                        left_on=['primary_title'],
                        right_on= ['movie'],
                        how='inner')
```

In [102]:
```
mov_bas_rat2
```

Out[102]:

	movie_id	primary_title	original_title	start_year	runtime_minutes	genre
0	tt0249516	Foodfight!	Foodfight!	2012	91.0	Action,Animation,Comec
1	tt0326592	The Overnight	The Overnight	2010	88.0	Nor
2	tt0337692	On the Road	On the Road	2012	124.0	Adventure,Drama,Romanc
3	tt0359950	The Secret Life of Walter Mitty	The Secret Life of Walter Mitty	2013	114.0	Adventure,Comedy,Drar
4	tt0365907	A Walk Among the Tombstones	A Walk Among the Tombstones	2014	114.0	Action,Crime,Drar
...	...	...	...	...	...	
2121	tt8680254	Richard III	Richard III	2016	NaN	Drar
2122	tt8824064	Heroes	Heroes	2019	88.0	Documenta
2123	tt8976772	Push	Push	2019	92.0	Documenta
2124	tt9024106	Unplanned	Unplanned	2019	106.0	Biography,Drar
2125	tt9248762	The Terrorist	The Terrorist	2018	NaN	Thrill

2126 rows × 14 columns

In [103]:
```
mov_bas_rat2.head()
```

Out[103]:

	movie_id	primary_title	original_title	start_year	runtime_minutes	genres
0	tt0249516	Foodfight!	Foodfight!	2012	91.0	Action,Animation,Comedy
1	tt0326592	The Overnight	The Overnight	2010	88.0	None
2	tt0337692	On the Road	On the Road	2012	124.0	Adventure,Drama,Romance
3	tt0359950	The Secret Life of Walter Mitty	The Secret Life of Walter Mitty	2013	114.0	Adventure,Comedy,Drama
4	tt0365907	A Walk Among the Tombstones	A Walk Among the Tombstones	2014	114.0	Action,Crime,Drama

In [104]:
```
mov_bas_rat2.shape
```

Out[104]:
```
(2126, 14)
```

In [105]:
```
mov_bas_rat2.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2126 entries, 0 to 2125
Data columns (total 14 columns):
 #   Column             Non-Null Count  Dtype  
---  ------             --------------  -----  
 0   movie_id           2126 non-null   object 
 1   primary_title      2126 non-null   object 
 2   original_title     2126 non-null   object 
 3   start_year         2126 non-null   int64  
 4   runtime_minutes    2072 non-null   float64
 5   genres             2124 non-null   object 
 6   averagerating      2126 non-null   float64
 7   numvotes           2126 non-null   int64  
 8   id                 2126 non-null   int64  
 9   release_date       2126 non-null   object 
 10  movie              2126 non-null   object 
 11  production_budget  2126 non-null   object 
 12  domestic_gross     2126 non-null   object 
 13  worldwide_gross    2126 non-null   object 
dtypes: float64(2), int64(3), object(9)
memory usage: 249.1+ KB
```

Removed null (missing data)

In [106]:
```
# Removed null data
mov_bas_rat2 = mov_bas_rat2.dropna(subset=['runtime_minutes','genres'])
```

In [107]:
```
mov_bas_rat2['genres']
```

Out[107]:
```
0        Action,Animation,Comedy
2        Adventure,Drama,Romance
3         Adventure,Comedy,Drama
4             Action,Crime,Drama
5        Action,Adventure,Sci-Fi
                  ...           
2118                       Drama
2120                       Drama
2122                 Documentary
2123                 Documentary
2124             Biography,Drama
Name: genres, Length: 2070, dtype: object
```

In [108]:
```
mov_bas_rat2.groupby('genres')
```

Out[108]:
```
<pandas.core.groupby.generic.DataFrameGroupBy object at 0x7fb274ec982
0>
```

In [109]:
```
# groupby objects are intended to be used with aggregation

mov_bas_rat2.groupby('genres').count()
```

Out[109]:

	movie_id	primary_title	original_title	start_year	runtime_minutes
genres					
Action	8	8	8	8	8
Action,Adventure	2	2	2	2	2
Action,Adventure,Animation	17	17	17	17	17
Action,Adventure,Biography	4	4	4	4	4
Action,Adventure,Comedy	28	28	28	28	28
...	...	...	...	...	...
Sci-Fi	3	3	3	3	3
Sci-Fi,Thriller	4	4	4	4	4
Thriller	17	17	17	17	17

In [110]:
```
mov_bas_rat2['genres'].value_counts()
```

Out[110]:
```
Drama                           146
Comedy                           75
Comedy,Drama                     71
Adventure,Animation,Comedy       68
Comedy,Drama,Romance             66
                               ... 
Comedy,Drama,Horror               1
Documentary,Drama,Family          1
Horror,Musical                    1
Drama,Music,Thriller              1
Documentary,Sport,Thriller        1
Name: genres, Length: 283, dtype: int64
```

Replace character from string - in worlwide_gross column

In [111]:
```
# replace $ character from string in pandas
# comma should be removed

mov_bas_rat2['worldwide_gross'] = mov_bas_rat2['worldwide_gross'].str.re

mov_bas_rat2
```

```
<ipython-input-111-30e9964e2f77>:4: 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/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  mov_bas_rat2['worldwide_gross'] = mov_bas_rat2['worldwide_gross'].s
tr.replace('$', '')
```

Out[111]:

	movie_id	primary_title	original_title	start_year	runtime_minutes	genre
0	tt0249516	Foodfight!	Foodfight!	2012	91.0	Action,Animation,Comec
2	tt0337692	On the Road	On the Road	2012	124.0	Adventure,Drama,Romanc
3	tt0359950	The Secret Life of Walter Mitty	The Secret Life of Walter Mitty	2013	114.0	Adventure,Comedy,Dram
4	tt0365907	A Walk Among the Tombstones	A Walk Among the Tombstones	2014	114.0	Action,Crime,Dram
5	tt0369610	Jurassic World	Jurassic World	2015	124.0	Action,Adventure,Sci-
...	...	...	...	...	...	
2118	tt8653840	Flawless	Haneshef	2018	97.0	Dram
2120	tt8662424	Never Again	Never Again	2017	106.0	Dram
2122	tt8824064	Heroes	Heroes	2019	88.0	Documenta
2123	tt8976772	Push	Push	2019	92.0	Documenta
2124	tt9024106	Unplanned	Unplanned	2019	106.0	Biography,Dram

2070 rows × 14 columns

In [112]:
```
# comma should be removed

mov_bas_rat2['worldwide_gross'] = mov_bas_rat2['worldwide_gross'].str.re

mov_bas_rat2
```

```
<ipython-input-112-b6b03974093b>:3: 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/panda
s-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
(https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.htm
l#returning-a-view-versus-a-copy)
  mov_bas_rat2['worldwide_gross'] = mov_bas_rat2['worldwide_gross'].s
tr.replace(',', '')
```

Out[112]:

	movie_id	primary_title	original_title	start_year	runtime_minutes	genre
0	tt0249516	Foodfight!	Foodfight!	2012	91.0	Action,Animation,Comec
2	tt0337692	On the Road	On the Road	2012	124.0	Adventure,Drama,Romanc
3	tt0359950	The Secret Life of Walter Mitty	The Secret Life of Walter Mitty	2013	114.0	Adventure,Comedy,Drar
4	tt0365907	A Walk Among the Tombstones	A Walk Among the Tombstones	2014	114.0	Action,Crime,Drar
5	tt0369610	Jurassic World	Jurassic World	2015	124.0	Action,Adventure,Sci-
...	...	...	...	...	...	
2118	tt8653840	Flawless	Haneshef	2018	97.0	Drar
2120	tt8662424	Never Again	Never Again	2017	106.0	Drar
2122	tt8824064	Heroes	Heroes	2019	88.0	Documenta
2123	tt8976772	Push	Push	2019	92.0	Documenta
2124	tt9024106	Unplanned	Unplanned	2019	106.0	Biography,Drar

2070 rows × 14 columns

In [113]:
```
mov_bas_rat2.dtypes
```

Out[113]:
```
movie_id              object
primary_title         object
original_title        object
start_year             int64
runtime_minutes      float64
genres                object
averagerating        float64
numvotes               int64
id                     int64
release_date          object
movie                 object
production_budget     object
domestic_gross        object
worldwide_gross       object
dtype: object
```

Turning string into float worldwide_gross column

In [114]:
```
# Turn string into float

mov_bas_rat2['worldwide_gross'] = mov_bas_rat2['worldwide_gross'].astype

print(mov_bas_rat2.dtypes)
```

```
movie_id              object
primary_title         object
original_title        object
start_year             int64
runtime_minutes      float64
genres                object
averagerating        float64
numvotes               int64
id                     int64
release_date          object
movie                 object
production_budget     object
domestic_gross        object
worldwide_gross      float64
dtype: object

<ipython-input-114-d7ef56b3769e>:3: 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
```

In [115]:
```
mov_bas_rat2
```

Out[115]:

	movie_id	primary_title	original_title	start_year	runtime_minutes	g
0	tt0249516	Foodfight!	Foodfight!	2012	91.0	Action,Animation,Cc
2	tt0337692	On the Road	On the Road	2012	124.0	Adventure,Drama,Ror
3	tt0359950	The Secret Life of Walter Mitty	The Secret Life of Walter Mitty	2013	114.0	Adventure,Comedy,[
4	tt0365907	A Walk Among the Tombstones	A Walk Among the Tombstones	2014	114.0	Action,Crime,[
5	tt0369610	Jurassic World	Jurassic World	2015	124.0	Action,Adventure,
...	...	...	...	...	...	
2118	tt8653840	Flawless	Haneshef	2018	97.0	[

Representing and manipulating date/ time

In [116]:
```
# retrieve the column
# It provides a variety of classes for representing and manipulating da
# as well as for formatting and parsing dates and times in a variety of

date_time = pd.to_datetime(mov_bas_rat2['release_date'])
date_time
```

Out[116]:
```
0       2012-12-31
2       2013-03-22
3       2013-12-25
4       2014-09-19
5       2015-06-12
           ...
2118    1999-11-24
2120    2002-07-12
2122    2008-10-24
2123    2009-02-06
2124    2019-03-29
Name: release_date, Length: 2070, dtype: datetime64[ns]
```

In [117]:
```
# Months

date_time.dt.month
```

Out[117]:
```
0       12
2        3
3       12
4        9
5        6
        ..
2118    11
2120     7
2122    10
2123     2
2124     3
Name: release_date, Length: 2070, dtype: int64
```

In [118]:
```
# added column for 'months'
mov_bas_rat2['months'] = date_time.dt.month
mov_bas_rat2
```

```
<ipython-input-118-06a5898e36ac>:2: 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/pa
ndas-docs/stable/user_guide/indexing.html#returning-a-view-versus-
a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/in
dexing.html#returning-a-view-versus-a-copy)
  mov_bas_rat2['months'] = date_time.dt.month
```

Out[118]:

	movie_id	primary_title	original_title	start_year	runtime_minutes	g
0	tt0249516	Foodfight!	Foodfight!	2012	91.0	Action,Animation,Co
2	tt0337692	On the Road	On the Road	2012	124.0	Adventure,Drama,Ror
3	tt0359950	The Secret Life of Walter	The Secret Life of	2013	114.0	Adventure,Comedy,D

In [119]:
```
mov_month = mov_bas_rat2.groupby(by=['months']).agg('mean')
mov_month
```

Out[119]:

	start_year	runtime_minutes	averagerating	numvotes	id	worldwide_
months						
1	2013.576923	102.376923	6.000000	49499.538462	52.300000	6.56477
2	2013.911565	102.517007	6.163265	78102.380952	53.585034	1.02230
3	2013.805714	102.588571	6.163429	82562.457143	50.720000	1.17919
4	2013.293103	103.597701	6.212069	60326.402299	49.936782	9.60685
5	2013.478261	105.333333	6.271014	125446.811594	47.811594	1.88112
6	2013.730061	103.920245	6.308589	100988.055215	50.226994	1.94368
7	2013.484663	104.840491	6.277914	107865.840491	50.392638	1.56319
8	2013.392045	99.840909	6.109091	67213.255682	54.323864	7.37300
9	2013.402235	102.206704	6.284916	71082.815642	48.201117	5.99063

Hihgest Worlwide Gross (top_month) associated with the Top Months

In [120]:
```

top_month = mov_month.sort_values(by = 'worldwide_gross', ascending=Fals
top_month
```

Out[120]:

	start_year	runtime_minutes	averagerating	numvotes	id	worldwide_
months						
6	2013.730061	103.920245	6.308589	100988.055215	50.226994	1.94368
5	2013.478261	105.333333	6.271014	125446.811594	47.811594	1.88112
11	2013.706897	108.816092	6.613218	120299.431034	47.551724	1.58241
7	2013.484663	104.840491	6.277914	107865.840491	50.392638	1.56319
3	2013.805714	102.588571	6.163429	82562.457143	50.720000	1.17919
12	2013.485944	105.742972	6.080321	74800.694779	51.349398	1.12961
2	2013.911565	102.517007	6.163265	78102.380952	53.585034	1.02230
4	2013.293103	103.597701	6.212069	60326.402299	49.936782	9.60685
8	2013.392045	99.840909	6.109091	67213.255682	54.323864	7.37300

In [121]:
```
mov_bas_rat2
```

Out[121]:

	movie_id	primary_title	original_title	start_year	runtime_minutes	g
0	tt0249516	Foodfight!	Foodfight!	2012	91.0	Action,Animation,Co
2	tt0337692	On the Road	On the Road	2012	124.0	Adventure,Drama,Ror
3	tt0359950	The Secret Life of Walter Mitty	The Secret Life of Walter Mitty	2013	114.0	Adventure,Comedy,[
4	tt0365907	A Walk Among the Tombstones	A Walk Among the Tombstones	2014	114.0	Action,Crime,[
5	tt0369610	Jurassic World	Jurassic World	2015	124.0	Action,Adventure,
...	...	...	...	...	...	
2118	tt8653840	Flawless	Haneshef	2018	97.0	[

In [122]:
```
mov_gen = mov_bas_rat2.groupby(by=['genres']).agg('mean')
mov_gen
```

Out[122]:

	start_year	runtime_minutes	averagerating	numvotes	
genres					
Action	2012.625000	92.125000	6.062500	7368.500000	42.
Action,Adventure	2012.000000	110.000000	6.350000	6972.500000	41.
Action,Adventure,Animation	2014.058824	100.294118	7.429412	180186.764706	45.
Action,Adventure,Biography	2015.000000	137.500000	7.250000	229733.000000	9.
Action,Adventure,Comedy	2014.857143	109.250000	6.392857	211068.678571	50.
...	...	...	...	...	
Sci-Fi	2014.000000	64.000000	4.066667	204.666667	29.
Sci-Fi,Thriller	2014.500000	89.500000	4.900000	7779.750000	58.
Thriller	2012.882353	89.941176	5.500000	330.058824	58.

Most Popular Genres based on Averagerating

In [123]:

```
pop_genre = mov_gen.sort_values(by = 'averagerating', ascending=False)
pop_genre.head(10)
```

Out[123]:

	start_year	runtime_minutes	averagerating	numvotes
genres				
Action,Documentary,Drama	2014.000000	60.000000	8.700000	22.000000
Drama,Mystery,War	2010.000000	131.000000	8.300000	124156.000000
Adventure,Drama,Sci-Fi	2014.500000	156.500000	8.300000	989725.000000
Crime,Documentary	2011.000000	113.000000	8.250000	48209.500000
Documentary,Drama,History	2013.000000	108.000000	8.100000	7998.000000
Documentary,Sport,Thriller	2017.000000	120.000000	7.900000	28979.000000
Adventure,Biography,Documentary	2014.333333	83.666667	7.833333	1020.333333
Documentary,Sport	2012.500000	96.500000	7.800000	1668.500000
Biography,Documentary,Drama	2013.250000	67.000000	7.725000	74.250000
Adventure,Documentary,History	2014.000000	90.000000	7.700000	506.000000

In [124]:

```
pop_genre_10 = pop_genre.head(10)
pop_genre_10
```

Out[124]:

	start_year	runtime_minutes	averagerating	numvotes
genres				
Action,Documentary,Drama	2014.000000	60.000000	8.700000	22.000000
Drama,Mystery,War	2010.000000	131.000000	8.300000	124156.000000
Adventure,Drama,Sci-Fi	2014.500000	156.500000	8.300000	989725.000000
Crime,Documentary	2011.000000	113.000000	8.250000	48209.500000
Documentary,Drama,History	2013.000000	108.000000	8.100000	7998.000000
Documentary,Sport,Thriller	2017.000000	120.000000	7.900000	28979.000000
Adventure,Biography,Documentary	2014.333333	83.666667	7.833333	1020.333333
Documentary,Sport	2012.500000	96.500000	7.800000	1668.500000
Biography,Documentary,Drama	2013.250000	67.000000	7.725000	74.250000
Adventure,Documentary,History	2014.000000	90.000000	7.700000	506.000000

Top Genres based on Worldwide Gross

In [125]:
```
# Top genres based on worldwide_gross

top_genre = mov_gen.sort_values(by = 'worldwide_gross', ascending=False
top_genre
```

Out[125]:

	start_year	runtime_minutes	averagerating	numvotes	
genres					
Adventure,Drama,Sport	2010.000000	93.000000	6.200000	62311.000000	56.0000
Adventure,Fantasy	2013.333333	139.666667	7.166667	375770.333333	36.3333
Adventure,Drama,Sci-Fi	2014.500000	156.500000	8.300000	989725.000000	39.0000
Action,Adventure,Sci-Fi	2014.581818	127.581818	6.660000	393743.963636	48.9272
Comedy,Mystery	2011.000000	102.000000	6.500000	432800.000000	39.0000
...	...	...	...	...	
Animation,Family	2014.000000	67.000000	6.200000	132.000000	91.0000
Action,Drama,Sport	2015.000000	98.000000	6.700000	81.000000	50.0000
Action,Crime,Fantasy	2017.000000	117.000000	6.400000	147834.000000	80.0000
Documentary,Sport,Thriller	2017.000000	120.000000	7.900000	28979.000000	91.0000
Western	2014.000000	84.000000	3.800000	104.000000	17.0000

283 rows × 7 columns

In [126]:
```
mov_bas_rat2
```

Out[126]:

	movie_id	primary_title	original_title	start_year	runtime_minutes	g
0	tt0249516	Foodfight!	Foodfight!	2012	91.0	Action,Animation,Co
2	tt0337692	On the Road	On the Road	2012	124.0	Adventure,Drama,Ror
3	tt0359950	The Secret Life of Walter Mitty	The Secret Life of Walter Mitty	2013	114.0	Adventure,Comedy,[
4	tt0365907	A Walk Among the Tombstones	A Walk Among the Tombstones	2014	114.0	Action,Crime,[
5	tt0369610	Jurassic World	Jurassic World	2015	124.0	Action,Adventure,
...	...	...	...	...	...	
2118	tt8653840	Flawless	Haneshef	2018	97.0	[

Analysis

In [127]:
```
import matplotlib.pyplot as plt
%matplotlib inline

import seaborn as sns

from scipy import stats
from sklearn.datasets import load_iris
```

In [128]:
```
pop_genre_10
```

Out[128]:

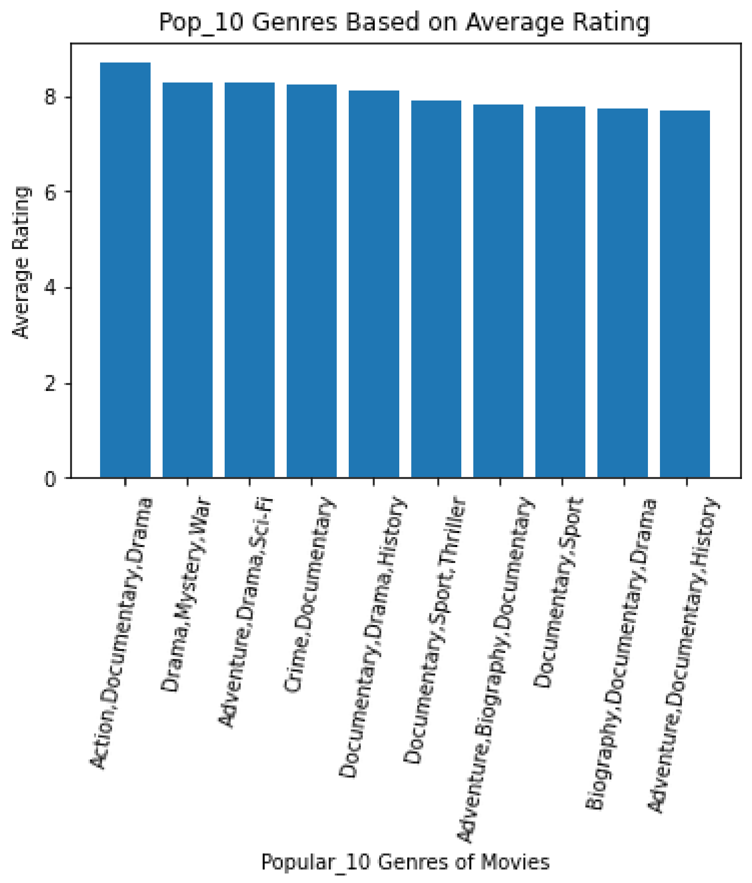
genres	start_year	runtime_minutes	averagerating	numvotes
Action,Documentary,Drama	2014.000000	60.000000	8.700000	22.000000
Drama,Mystery,War	2010.000000	131.000000	8.300000	124156.000000
Adventure,Drama,Sci-Fi	2014.500000	156.500000	8.300000	989725.000000
Crime,Documentary	2011.000000	113.000000	8.250000	48209.500000
Documentary,Drama,History	2013.000000	108.000000	8.100000	7998.000000
Documentary,Sport,Thriller	2017.000000	120.000000	7.900000	28979.000000
Adventure,Biography,Documentary	2014.333333	83.666667	7.833333	1020.333333
Documentary,Sport	2012.500000	96.500000	7.800000	1668.500000
Biography,Documentary,Drama	2013.250000	67.000000	7.725000	74.250000
Adventure,Documentary,History	2014.000000	90.000000	7.700000	506.000000

Popular 10 Genres based on Averagerating

In [129]:
```
fig, ax = plt.subplots()
ax.bar(x= pop_genre_10.index, height= pop_genre_10['averagerating'])
plt.title('Pop_10 Genres Based on Average Rating')
ax.set_xlabel('Popular_10 Genres of Movies')
ax.set_ylabel('Average Rating')


plt.savefig("pop_10.png", transparent = True, dpi=150)

plt.xticks(rotation=80);
plt.show()
```



Explanation # Pop_10_Genres Graph

Pop_10 genre bar graph displays us the most popular ten movies. All ten movie genres have very close average ratings to each other.

In [130]:
```
top_genre_10 = top_genre.head(10)
top_genre_10
```

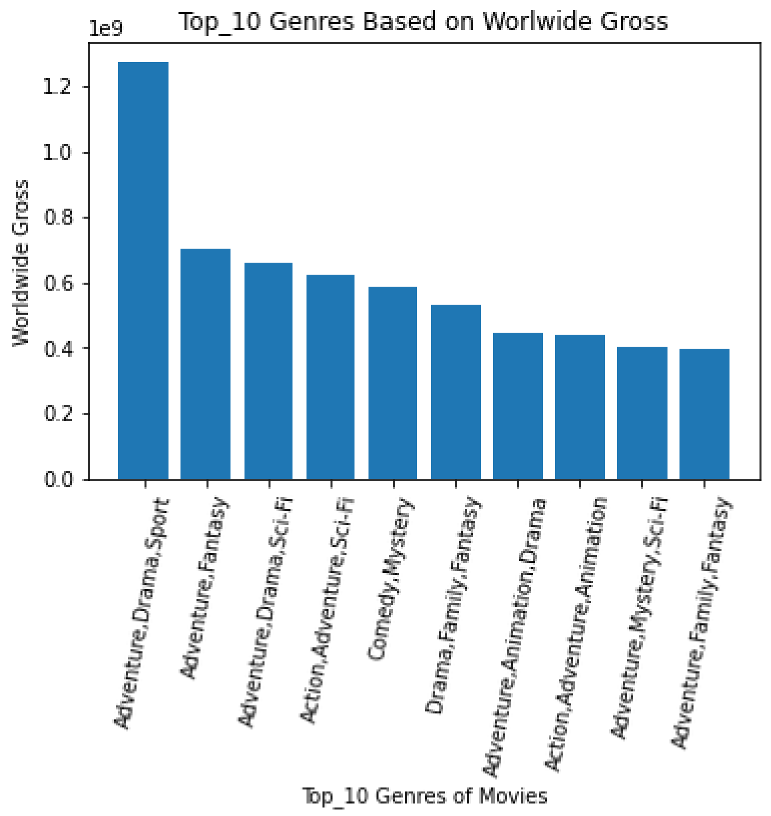
Out[130]:

	start_year	runtime_minutes	averagerating	numvotes	
genres					
Adventure,Drama,Sport	2010.000000	93.000000	6.200000	62311.000000	56.00
Adventure,Fantasy	2013.333333	139.666667	7.166667	375770.333333	36.33
Adventure,Drama,Sci-Fi	2014.500000	156.500000	8.300000	989725.000000	39.00
Action,Adventure,Sci-Fi	2014.581818	127.581818	6.660000	393743.963636	48.92
Comedy,Mystery	2011.000000	102.000000	6.500000	432800.000000	39.00
Drama,Family,Fantasy	2015.000000	105.000000	6.900000	142792.000000	13.00
Adventure,Animation,Drama	2013.000000	94.000000	4.800000	11728.000000	100.00
Action,Adventure,Animation	2014.058824	100.294118	7.429412	180186.764706	45.94
Adventure,Mystery,Sci-Fi	2012.000000	124.000000	7.000000	538720.000000	75.00
Adventure,Family,Fantasy	2014.333333	117.133333	6.120000	162054.600000	41.06

In [131]:
```
# top_10 genre based on worldwide gross

fig, ax = plt.subplots()
ax.bar(x= top_genre_10.index, height= top_genre_10['worldwide_gross'])
plt.title('Top_10 Genres Based on Worlwide Gross')
ax.set_xlabel('Top_10 Genres of Movies')
ax.set_ylabel('Worldwide Gross')

plt.savefig("top_10.png", dpi=150)
plt.xticks(rotation=80);
```



Explanation # Top_10_Genres Graph

Top_10 genre bar graph displays us the most top ten movies based on worldwide gross. 'Adventure,Drama,Sport' is the sharply highest of top ten movie genres compared to other genres. Rest of the genres are close each other as shown graph.

Hihgest Worlwide Gross (top_month) according to the top month

In [132]:
```
top_month
```

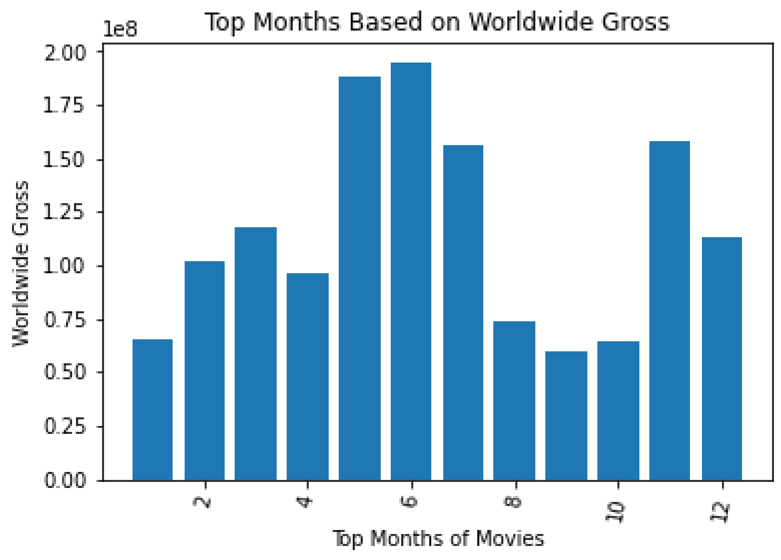
Out[132]:

	start_year	runtime_minutes	averagerating	numvotes	id	worldwide_gros
months						
6	2013.730061	103.920245	6.308589	100988.055215	50.226994	1.943681e+(
5	2013.478261	105.333333	6.271014	125446.811594	47.811594	1.881128e+(
11	2013.706897	108.816092	6.613218	120299.431034	47.551724	1.582411e+(
7	2013.484663	104.840491	6.277914	107865.840491	50.392638	1.563193e+(
3	2013.805714	102.588571	6.163429	82562.457143	50.720000	1.179195e+(
12	2013.485944	105.742972	6.080321	74800.694779	51.349398	1.129617e+(
2	2013.911565	102.517007	6.163265	78102.380952	53.585034	1.022302e+(
4	2013.293103	103.597701	6.212069	60326.402299	49.936782	9.606857e+(
8	2013.392045	99.840909	6.109091	67213.255682	54.323864	7.373001e+(
1	2013.576923	102.376923	6.000000	49499.538462	52.300000	6.564779e+(
10	2013.519802	104.143564	6.260891	80544.797030	50.074257	6.460824e+(
9	2013.402235	102.206704	6.284916	71082.815642	48.201117	5.990639e+(

In [133]:
```
# hihgest worlwide gross (top_month) according to the month

fig, ax = plt.subplots()
ax.bar(x= top_month.index, height= top_month['worldwide_gross'])
plt.title('Top Months Based on Worldwide Gross')
ax.set_xlabel('Top Months of Movies')
ax.set_ylabel('Worldwide Gross')

plt.savefig("top_month.png", dpi=150)
plt.xticks(rotation=80);
```



Explanation # Top_Month Graph

This graph shows that relationship between top months and the highest worlwide gross. We can obviously analyze that the best profitable months according to the highest worldwide gross. As shown on the graph, 5th, 6th, 7th and 11th months are the most lucrative time to release the movies.

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Result

Most popular and top movies are resulted based on ratings, worldwide turnover and for the best season to release them.

Conclusion

This analysis leads to three recommendations for following procedures of Microsoft new studio:

1. 'Adventure, Documentary, Drama', ‘Drama, Mystery, War’, ‘Adventure, Drama, Sci-Fi’, ‘Crime-Documentary ‘, ‘Documentary, Drama, History’ are the pop 5 genres of movies based on audience's highest ratings as analysis result. Pop 10 movies are displayed into related bar graph.
2. The highest genre among top 10 genres of movies features as “Adventure,Drama,Sport” based on worldwide turnover. “Adventure-Fantasy”, “Adventure,Drama,Sci-Fi” could be concerned as following options within 50% percentage of Adventure,Drama,Sport”.
3. Microsoft studio can concern the best profitable months are May, June and July summer season based on the highest worldwide gross. Furthermore November is another option which is close to July potential among the top months to release the movie.

Next Step

Further analyses could yield additional insights to further improve operations at Microsoft:

1. Priority on this analysis is based on relationship among the Pop_10 genres, Top_10 genres, Ratings, Best Season and Global Turnover.
2. The related analysis does not include runtime of movies, it is available in different database, not evaluated in above analysis.
3. This analysis is based on the information as below links. They does not include, actor, director, writer information. Based on different sources, it could be observed for another recommendation.

For More Information

See the full analysis in the Jupyter Notebook or review this presentation.

For additional info, contact drykvf@gmail.com (mailto:drykvf@gmail.com)

Repository Structure

├── data ├── images ├── README.md ├── .pdf └── .ipynb