Investigate_a_Dataset

December 31, 2022

1

1.1 Introduction

1.1.1 For my project, I am going to analyse the TMDb movie data set. This dataset contains about 10,000 movies collected from The Movie Database (TMDb). A quick scan of the dataset csv file can show us that it has about 10,000 rows and 21 columns. I can also notice that some columns have null values for example release_date column.

2 Questions

2.0.1 Some questions I asked myself are, ”Which year produced the highest release of movies?” and ”Which movie genre is the produced the highest and lowest number of movies?” These questions are going to help me explore the data in depth.

```
In [28]: # Use this cell to set up import statements for all of the packages that you
         #   plan to use.
         import pandas as pd
         import numpy as np
         import matplotlib.pyplot as plt
         import seaborn as sns
         % matplotlib inline

         # Remember to include a 'magic word' so that your visualizations are plotted
         #   inline with the notebook. See this page for more:
         #   http://ipython.readthedocs.io/en/stable/interactive/magics.html
```

```
In [29]: # Upgrade pandas to use dataframe.explode() function.
         !pip install --upgrade pandas==0.25.0
```

```
Requirement already up-to-date: pandas==0.25.0 in /opt/conda/lib/python3.6/site-packages (0.25.0
Requirement already satisfied, skipping upgrade: pytz>=2017.2 in /opt/conda/lib/python3.6/site-p
Requirement already satisfied, skipping upgrade: numpy>=1.13.3 in /opt/conda/lib/python3.6/site-
Requirement already satisfied, skipping upgrade: python-dateutil>=2.6.1 in /opt/conda/lib/python
Requirement already satisfied, skipping upgrade: six>=1.5 in /opt/conda/lib/python3.6/site-packa
```

## Data Wrangling

3 In this section of the report, you will load in the data, check for cleanliness, and then trim and clean your dataset for analysis.

```
In [30]: # Load your data and print out a few lines. Perform operations to inspect data
         df = pd.read_csv('tmdb-movies.csv')
         df.head(5)
```

```
Out[30]:        id    imdb_id  popularity     budget     revenue  \
         0  135397  tt0369610   32.985763  150000000  1513528810
         1   76341  tt1392190   28.419936  150000000   378436354
         2  262500  tt2908446   13.112507  110000000   295238201
         3  140607  tt2488496   11.173104  200000000  2068178225
         4  168259  tt2820852    9.335014  190000000  1506249360

                          original_title  \
         0                Jurassic World
         1            Mad Max: Fury Road
         2                     Insurgent
         3  Star Wars: The Force Awakens
         4                     Furious 7

                                                         cast  \
         0  Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...
         1  Tom Hardy|Charlize Theron|Hugh Keays-Byrne|Nic...
         2  Shailene Woodley|Theo James|Kate Winslet|Ansel...
         3  Harrison Ford|Mark Hamill|Carrie Fisher|Adam D...
         4  Vin Diesel|Paul Walker|Jason Statham|Michelle ...

                                                     homepage          director  \
         0                      http://www.jurassicworld.com/   Colin Trevorrow
         1                        http://www.madmaxmovie.com/     George Miller
         2     http://www.thedivergentseries.movie/#insurgent  Robert Schwentke
         3  http://www.starwars.com/films/star-wars-episod...       J.J. Abrams
         4                           http://www.furious7.com/         James Wan

                                 tagline  ...  \
         0            The park is open.  ...
         1           What a Lovely Day.  ...
         2     One Choice Can Destroy You  ...
         3  Every generation has a story.  ...
         4            Vengeance Hits Home  ...

                                                     overview runtime  \
         0  Twenty-two years after the events of Jurassic ...     124
         1  An apocalyptic story set in the furthest reach...     120
         2  Beatrice Prior must confront her inner demons ...     119
         3  Thirty years after defeating the Galactic Empi...     136
         4  Deckard Shaw seeks revenge against Dominic Tor...     137
```

```
                                      genres  \
0  Action|Adventure|Science Fiction|Thriller
1  Action|Adventure|Science Fiction|Thriller
2         Adventure|Science Fiction|Thriller
3   Action|Adventure|Science Fiction|Fantasy
4                      Action|Crime|Thriller

                                production_companies release_date vote_count  \
0  Universal Studios|Amblin Entertainment|Legenda...       6/9/15       5562
1  Village Roadshow Pictures|Kennedy Miller Produ...      5/13/15       6185
2  Summit Entertainment|Mandeville Films|Red Wago...      3/18/15       2480
3          Lucasfilm|Truenorth Productions|Bad Robot     12/15/15       5292
4  Universal Pictures|Original Film|Media Rights ...       4/1/15       2947

   vote_average  release_year    budget_adj   revenue_adj
0           6.5          2015  1.379999e+08  1.392446e+09
1           7.1          2015  1.379999e+08  3.481613e+08
2           6.3          2015  1.012000e+08  2.716190e+08
3           7.5          2015  1.839999e+08  1.902723e+09
4           7.3          2015  1.747999e+08  1.385749e+09

[5 rows x 21 columns]
```

```
In [31]: # types and look for instances of missing or possibly errant data
         df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10866 entries, 0 to 10865
Data columns (total 21 columns):
id                      10866 non-null int64
imdb_id                 10856 non-null object
popularity              10866 non-null float64
budget                  10866 non-null int64
revenue                 10866 non-null int64
original_title          10866 non-null object
cast                    10790 non-null object
homepage                2936 non-null object
director                10822 non-null object
tagline                 8042 non-null object
keywords                9373 non-null object
overview                10862 non-null object
runtime                 10866 non-null int64
genres                  10843 non-null object
production_companies    9836 non-null object
release_date            10866 non-null object
vote_count              10866 non-null int64
vote_average            10866 non-null float64
```

```
release_year            10866 non-null int64
budget_adj              10866 non-null float64
revenue_adj             10866 non-null float64
dtypes: float64(4), int64(6), object(11)
memory usage: 1.7+ MB
```

```
In [32]: #show the rows and columns of the dataset
         df.shape
```

```
Out[32]: (10866, 21)
```

```
In [33]: # values of missing data per column
         df.isnull().sum()
```

```
Out[33]: id                         0
         imdb_id                   10
         popularity                 0
         budget                     0
         revenue                    0
         original_title             0
         cast                      76
         homepage                7930
         director                  44
         tagline                 2824
         keywords                1493
         overview                   4
         runtime                    0
         genres                    23
         production_companies    1030
         release_date               0
         vote_count                 0
         vote_average               0
         release_year               0
         budget_adj                 0
         revenue_adj                0
         dtype: int64
```

```
In [34]: df.duplicated().sum()
```

```
Out[34]: 1
```

4 Data Cleaning

4.1 Here we remove information that we don't need to use during our analysis

```
In [35]: # After discussing the structure of the data and any problems that need to be
         #   cleaned, perform those cleaning steps in the second part of this section.
         #drop the duplicated rows
         df.drop_duplicates(inplace=True)
         df.shape

Out[35]: (10865, 21)

In [36]: #drop the columns that I will not use in my analysis
         df.drop(columns = ['imdb_id', 'homepage', 'production_companies', 'tagline', 'keywords'
         df.shape

Out[36]: (10865, 16)

In [37]: #check missing values
         df.info()

<class 'pandas.core.frame.DataFrame'>
Int64Index: 10865 entries, 0 to 10865
Data columns (total 16 columns):
id                  10865 non-null int64
popularity          10865 non-null float64
budget              10865 non-null int64
revenue             10865 non-null int64
original_title      10865 non-null object
cast                10789 non-null object
director            10821 non-null object
overview            10861 non-null object
runtime             10865 non-null int64
genres              10842 non-null object
release_date        10865 non-null object
vote_count          10865 non-null int64
vote_average        10865 non-null float64
release_year        10865 non-null int64
budget_adj          10865 non-null float64
revenue_adj         10865 non-null float64
dtypes: float64(4), int64(6), object(6)
memory usage: 1.4+ MB


In [38]: #handle missing values by filling in missing values with the previous valid value in th
         df.fillna(method='ffill', inplace=True)
         df.info()

<class 'pandas.core.frame.DataFrame'>
Int64Index: 10865 entries, 0 to 10865
Data columns (total 16 columns):
id                  10865 non-null int64
popularity          10865 non-null float64
budget              10865 non-null int64
revenue             10865 non-null int64
original_title      10865 non-null object
```

```
cast                 10865 non-null object
director             10865 non-null object
overview             10865 non-null object
runtime              10865 non-null int64
genres               10865 non-null object
release_date         10865 non-null object
vote_count           10865 non-null int64
vote_average         10865 non-null float64
release_year         10865 non-null int64
budget_adj           10865 non-null float64
revenue_adj          10865 non-null float64
dtypes: float64(4), int64(6), object(6)
memory usage: 1.4+ MB
```

```
In [39]: #change date format
         df['release_date'] = pd.to_datetime(df['release_date'])
         df['release_date'].head()
```

```
Out[39]: 0   2015-06-09
         1   2015-05-13
         2   2015-03-18
         3   2015-12-15
         4   2015-04-01
         Name: release_date, dtype: datetime64[ns]
```

```
In [40]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 10865 entries, 0 to 10865
Data columns (total 16 columns):
id                   10865 non-null int64
popularity           10865 non-null float64
budget               10865 non-null int64
revenue              10865 non-null int64
original_title       10865 non-null object
cast                 10865 non-null object
director             10865 non-null object
overview             10865 non-null object
runtime              10865 non-null int64
genres               10865 non-null object
release_date         10865 non-null datetime64[ns]
vote_count           10865 non-null int64
vote_average         10865 non-null float64
release_year         10865 non-null int64
budget_adj           10865 non-null float64
revenue_adj          10865 non-null float64
dtypes: datetime64[ns](1), float64(4), int64(6), object(5)
```

```
memory usage: 1.4+ MB
```

## Exploratory Data Analysis

4.2 Here we Compute statistics and create visualizations with the goal of addressing the research questions at the Introduction section.

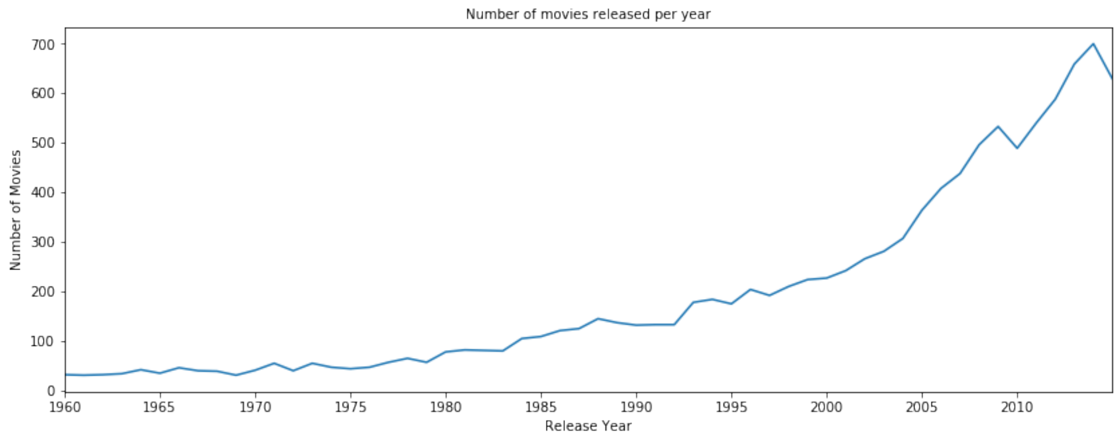
4.2.1 Research Question 1 - Which year produced the highest release of movies?

```
In [41]: # Use this, and more code cells, to explore your data. Don't forget to add
         #   Markdown cells to document your observations and findings.
         #group data by release-year column then find the totals in terns of the id
         df_movies = df.groupby('release_year').count()['id']
         df_movies.tail()
```

```
Out[41]: release_year
         2011    540
         2012    588
         2013    659
         2014    700
         2015    629
         Name: id, dtype: int64
```

```
In [42]: #plot the data for viusalisation
         df_movies.plot(xticks = np.arange(1960,2015,5), figsize = (14,5))
         plt.title("Number of movies released per year", fontsize = 10)
         plt.xlabel("Release Year", fontsize = 10)
         plt.ylabel("Number of Movies", fontsize = 10)
```

```
Out[42]: Text(0,0.5,'Number of Movies')
```



4.2.2 Research Question 2 - Which movie genre is the produced the highest and lowest number of movies?

```
In [43]: # Continue to explore the data to address your additional research
         #   questions. Add more headers as needed if you have more questions to
         #   investigate.
         # some entries in the genre column contain multiple entries. We will split the out the
         df_genre = df
         # columns to split by "|"
         df_genre['genres'] = df['genres'].apply(lambda x: x.split("|")[0])
```

```
In [44]: # Confirm for split
         df_genre.genres.unique()
```

```
Out[44]: array(['Action', 'Adventure', 'Western', 'Science Fiction', 'Drama',
                'Family', 'Comedy', 'Crime', 'Romance', 'War', 'Mystery',
                'Thriller', 'Fantasy', 'History', 'Animation', 'Horror', 'Music',
                'Documentary', 'TV Movie', 'Foreign'], dtype=object)
```

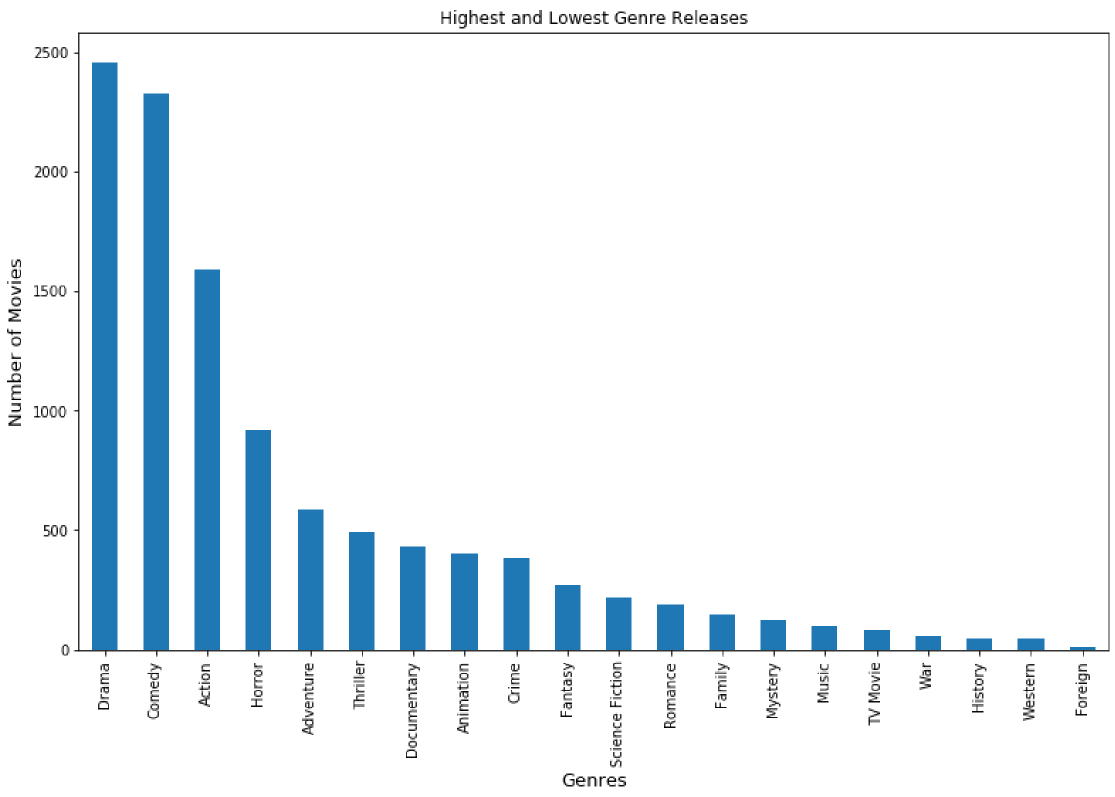
```
In [45]: #we use groupby to group the genre column then find total number of each movie and also
         df_genre = df.groupby(['genres']).count()['id'].sort_values(ascending=False)
         df_genre
```

```
Out[45]: genres
         Drama              2459
         Comedy             2324
         Action             1591
         Horror              916
         Adventure           586
         Thriller            492
         Documentary         433
         Animation           404
         Crime               382
         Fantasy             272
         Science Fiction     216
         Romance             186
         Family              145
         Mystery             125
         Music               100
         TV Movie             79
         War                  59
         History              44
         Western              43
         Foreign               9
         Name: id, dtype: int64
```

```
In [49]: #visualization
         df_genre.plot(kind = 'bar', figsize = (13,8))
         plt.title('Highest and Lowest Genre Releases', fontsize = 12)
```

```
        plt.xlabel('Genres', fontsize = 13)
        plt.ylabel('Number of Movies', fontsize = 13)
```

```
Out[49]: Text(0,0.5,'Number of Movies')
```



## Conclusions

5 After careful analysis of this dataset, we can finally answer or questions. The year 2014 produced the highest release of movies. In addition to that, we can also see that the graph is skewed to the right meaning the release of movies increased as the years went by.

6 Drama Genre produced the highest number of movies while Foreign goes in with the least number of movies produced.

7 Limitations

8 During cleaning, We filled up some of the missing data in columns such as the genre column. This might the validity of the results we accrued.

```
In [52]: from subprocess import call
         call(['python', '-m', 'nbconvert', 'Investigate_a_Dataset.ipynb'])

Out[52]: 0

In [ ]:
```