Project: Investigating the TMDb Movie Dataset

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Introduction

In this analysis I would be investigating a movie dataset. The data set contains information about a little over 10,000 movies collected from The Movie Database (TMDb), it also includes features such as casts, genre, user ratings, budget and revenue. The last two columns 'budget_adj' and 'revenue_adj' of the associated movies is in terms of the dollars rate in year 2010, while accounting for inflation.

This project would be answering questions as regards movies popularity, such as;

1. Do Directors' choice affect the popularity of movies?
2. Is there a relationship between the year of release and the popularity of movies?
3. What genre of movies got popular over the years?
4. How did people rate the popular movies?

To begin analysis, the necessary packages would be installed in the next cell.

In [1]:
```
# installing packages for analysis
import numpy as np
import pandas as pd
%matplotlib inline
import seaborn as sns
import matplotlib.pyplot as plt
```

Data Wrangling

> In this section, I would pass the dataset (a csv file) through Pandas. This would make it easy for me to do my analysis (as it becomes a dataframe), if errors are found in the data set they'd be handled in this section.

The cell below reads the csv file using pandas and returns the first five rows of the dataset. This is just to have an overview of the data.

In [11]:
```
# using pandas to read csv file
df = pd.read_csv('tmdb-movies.csv')
# returns the first 5 rows of the dataset to have an overview
df.head(5)
```

Out[11]:

	id	imdb_id	popularity	budget	revenue	original_title	cast	homepage	director
0	135397	tt0369610	32.985763	150000000	1513528810	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	http://www.jurassicworld.com/	Colin Trevorrow
1	76341	tt1392190	28.419936	150000000	378436354	Mad Max: Fury Road	Tom Hardy|Charlize Theron|Hugh Keays-Byrne|Nic...	http://www.madmaxmovie.com/	George Miller
2	262500	tt2908446	13.112507	110000000	295238201	Insurgent	Shailene Woodley|Theo James|Kate Winslet|Ansel...	http://www.thedivergentseries.movie/#insurgent	Robert Schwentke
3	140607	tt2488496	11.173104	200000000	2068178225	Star Wars: The Force Awakens	Harrison Ford|Mark Hamill|Carrie Fisher|Adam D...	http://www.starwars.com/films/star-wars-episod...	J.J. Abrams
4	168259	tt2820852	9.335014	190000000	1506249360	Furious 7	Vin Diesel|Paul Walker|Jason Statham|Michelle ...	http://www.furious7.com/	James Wan

5 rows × 21 columns

The next cell tells us how many rows and columns are in the dataset

In [12]:
```
# this displays the number of rows and columns
df.shape
```

Out[12]:
```
(10866, 21)
```

The previous cell tells us that the data set has 10,866 rows and 21 columns. The columns are:

1. id
2. imdb_id
3. popularity
4. budget
5. revenue
6. original_title
7. cast
8. homepage
9. director
10. tagline
11. keywords
12. overview
13. runtime
14. genres
15. production_companies
16. release_date
17. vote_count
18. vote_average
19. release_year
20. budget_adj
21. revenue_adj

It is important to do a quick summary as it points us to what might be wrong in the data.

In [13]:
```
# quick statistic summary of the data set
df.describe()
```

Out[13]:

	id	popularity	budget	revenue	runtime	vote_count	vote_average	release_year	budget_adj	re
count	10866.000000	10866.000000	1.086600e+04	1.086600e+04	10866.000000	10866.000000	10866.000000	10866.000000	1.086600e+04	1.08
mean	66064.177434	0.646441	1.462570e+07	3.982332e+07	102.070863	217.389748	5.974922	2001.322658	1.755104e+07	5.13
std	92130.136561	1.000185	3.091321e+07	1.170035e+08	31.381405	575.619058	0.935142	12.812941	3.430616e+07	1.44
min	5.000000	0.000065	0.000000e+00	0.000000e+00	0.000000	10.000000	1.500000	1960.000000	0.000000e+00	0.0(
25%	10596.250000	0.207583	0.000000e+00	0.000000e+00	90.000000	17.000000	5.400000	1995.000000	0.000000e+00	0.0(
50%	20669.000000	0.383856	0.000000e+00	0.000000e+00	99.000000	38.000000	6.000000	2006.000000	0.000000e+00	0.0(
75%	75610.000000	0.713817	1.500000e+07	2.400000e+07	111.000000	145.750000	6.600000	2011.000000	2.085325e+07	3.3(
max	417859.000000	32.985763	4.250000e+08	2.781506e+09	900.000000	9767.000000	9.200000	2015.000000	4.250000e+08	2.8(

From the cell above, the count value gives us an idea of how many values are present in each column, and statistics like mean, standard deviation, minimum and maximum values amongst others are displayed. We can also see that the 'budget', 'revenue', 'budget_adj', 'revenue_adj' columns all have their min, first quartile and second quartile to be zeros, this would affect the analysis, if not properly handled.

It is also important to get information like data types, to see if there's an error in any column's data type and also to determine if there are Null values present in the dataset. That is what the code in the next cell aims to achieve.

In [14]:
```
#quick information on the dataset
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10866 entries, 0 to 10865
Data columns (total 21 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   id                    10866 non-null  int64  
 1   imdb_id               10856 non-null  object 
 2   popularity            10866 non-null  float64
 3   budget                10866 non-null  int64  
 4   revenue               10866 non-null  int64  
 5   original_title        10866 non-null  object 
 6   cast                  10790 non-null  object 
 7   homepage              2936 non-null   object 
 8   director              10822 non-null  object 
 9   tagline               8042 non-null   object 
 10  keywords              9373 non-null   object 
 11  overview              10862 non-null  object 
 12  runtime               10866 non-null  int64  
 13  genres                10843 non-null  object 
 14  production_companies  9836 non-null   object 
 15  release_date          10866 non-null  object 
 16  vote_count            10866 non-null  int64  
 17  vote_average          10866 non-null  float64
 18  release_year          10866 non-null  int64  
 19  budget_adj            10866 non-null  float64
 20  revenue_adj           10866 non-null  float64
dtypes: float64(4), int64(6), object(11)
memory usage: 1.7+ MB
```

The data types appears to be alright, but there are Null values present. The next cell tells us how many there are in each column.

In [15]:
```
# returns the rows with missing values
df.isna().sum()
```

Out[15]:

```
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
```

Also, are there duplicated rows in this data? Let's find out.

In [16]:
```
df.duplicated().sum()
```

Out[16]:
```
1
```

Yes, there is a duplicated row.

Our dataset appears to have missing or null values, zero values, a duplicated row, as well as unneccessary columns. These would be handled in the data cleaning section.

Data Cleaning

> In this section, the issues highlighted in the data will be resolved.

First, the columns that are not relevant to answering the questions are dropped.

In [17]:
```
# returns a new dataframe with the irrelevant columns dropped
df = df.drop(columns=['imdb_id','budget','revenue','homepage','tagline','keywords','overview','runtime','releas
df.head()
```

Out[17]:

	id	popularity	original_title	cast	director	genres	production_companies	vote_average	release_year
0	135397	32.985763	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	Colin Trevorrow	Action|Adventure|Science Fiction|Thriller	Universal Studios|Amblin Entertainment|Legenda...	6.5	2015
1	76341	28.419936	Mad Max: Fury Road	Tom Hardy|Charlize Theron|Hugh Keays-Byrne|Nic...	George Miller	Action|Adventure|Science Fiction|Thriller	Village Roadshow Pictures|Kennedy Miller Produ...	7.1	2015
2	262500	13.112507	Insurgent	Shailene Woodley|Theo James|Kate Winslet|Ansel...	Robert Schwentke	Adventure|Science Fiction|Thriller	Summit Entertainment|Mandeville Films|Red Wago...	6.3	2015
3	140607	11.173104	Star Wars: The Force Awakens	Harrison Ford|Mark Hamill|Carrie Fisher|Adam D...	J.J. Abrams	Action|Adventure|Science Fiction|Fantasy	Lucasfilm|Truenorth Productions|Bad Robot	7.5	2015
4	168259	9.335014	Furious 7	Vin Diesel|Paul Walker|Jason Statham|Michelle ...	James Wan	Action|Crime|Thriller	Universal Pictures|Original Film|Media Rights ...	7.3	2015

We can see from the first five rows that these columns are now dropped, let's do a quick summary statistic on the new data set.

In [18]:
```
df.describe()
```

Out[18]:

	id	popularity	vote_average	release_year
count	10866.000000	10866.000000	10866.000000	10866.000000
mean	66064.177434	0.646441	5.974922	2001.322658
std	92130.136561	1.000185	0.935142	12.812941
min	5.000000	0.000065	1.500000	1960.000000
25%	10596.250000	0.207583	5.400000	1995.000000
50%	20669.000000	0.383856	6.000000	2006.000000
75%	75610.000000	0.713817	6.600000	2011.000000
max	417859.000000	32.985763	9.200000	2015.000000

Zero values are no longer present, after dropping those columns. Let's do a check on Null Values.

In [19]:
```
# returns null values
df.isna().sum()
```

Out[19]:
```
id                      0
popularity              0
original_title          0
cast                   76
director               44
genres                 23
production_companies    1030
vote_average            0
release_year            0
dtype: int64
```

There appear to be some Null values, so I'd drop all null values. This might be an ideal way to handle missing values, but for this report,

the number of the Null values in the cast, director and genres columns are very small compared to the entire dataset. Also, the production company column is not answering any of this reports questions.

In [20]:
```
# drop null values
df.dropna(subset = ['cast', 'director', 'genres', 'production_companies'], how='any', inplace=True)
```

Missing values are dropped and inplace set to True, so that the changes saves in the data.

In [21]:
```
#drops duplicates
df.drop_duplicates()
```

Out[21]:

	id	popularity	original_title	cast	director	genres	production_companies	vote_average	rele
0	135397	32.985763	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	Colin Trevorrow	Action|Adventure|Science Fiction|Thriller	Universal Studios|Amblin Entertainment|Legenda...	6.5	
1	76341	28.419936	Mad Max: Fury Road	Tom Hardy|Charlize Theron|Hugh Keays-Byrne|Nic...	George Miller	Action|Adventure|Science Fiction|Thriller	Village Roadshow Pictures|Kennedy Miller Produ...	7.1	
2	262500	13.112507	Insurgent	Shailene Woodley|Theo James|Kate Winslet|Ansel...	Robert Schwentke	Adventure|Science Fiction|Thriller	Summit Entertainment|Mandeville Films|Red Wago...	6.3	
3	140607	11.173104	Star Wars: The Force Awakens	Harrison Ford|Mark Hamill|Carrie Fisher|Adam D...	J.J. Abrams	Action|Adventure|Science Fiction|Fantasy	Lucasfilm|Truenorth Productions|Bad Robot	7.5	
4	168259	9.335014	Furious 7	Vin Diesel|Paul Walker|Jason Statham|Michelle ...	James Wan	Action|Crime|Thriller	Universal Pictures|Original Film|Media Rights ...	7.3	
...	...	...	...	...	...	...	...	...	
10861	21	0.080598	The Endless Summer	Michael Hynson|Robert August|Lord 'Tally Ho' B...	Bruce Brown	Documentary	Bruce Brown Films	7.4	
10862	20379	0.065543	Grand Prix	James Garner|Eva Marie Saint|Yves Montand|Tosh...	John Frankenheimer	Action|Adventure|Drama	Cherokee Productions|Joel Productions|Douglas ...	5.7	
10863	39768	0.065141	Beregis Avtomobilya	Innokentiy Smoktunovskiy|Oleg Efremov|Georgi Z...	Eldar Ryazanov	Mystery|Comedy	Mosfilm	6.5	
10864	21449	0.064317	What's Up, Tiger Lily?	Tatsuya Mihashi|Akiko Wakabayashi|Mie Hama|Joh...	Woody Allen	Action|Comedy	Benedict Pictures Corp.	5.4	
10865	22293	0.035919	Manos: The Hands of Fate	Harold P. Warren|Tom Neyman|John Reynolds|Dian...	Harold P. Warren	Horror	Norm-Iris	1.5	

9772 rows × 9 columns

The duplicated row is dropped now. Let's do another statistical summary.

In [22]:
```
df.describe()
```

Out[22]:

	id	popularity	vote_average	release_year
count	9773.000000	9773.000000	9773.000000	9773.000000
mean	63187.492479	0.694711	5.963430	2000.879362
std	90713.666750	1.036879	0.913179	13.036453
min	5.000000	0.000188	1.500000	1960.000000
25%	10222.000000	0.232756	5.400000	1994.000000
50%	18681.000000	0.419765	6.000000	2005.000000
75%	70577.000000	0.776380	6.600000	2011.000000
max	417859.000000	32.985763	8.700000	2015.000000

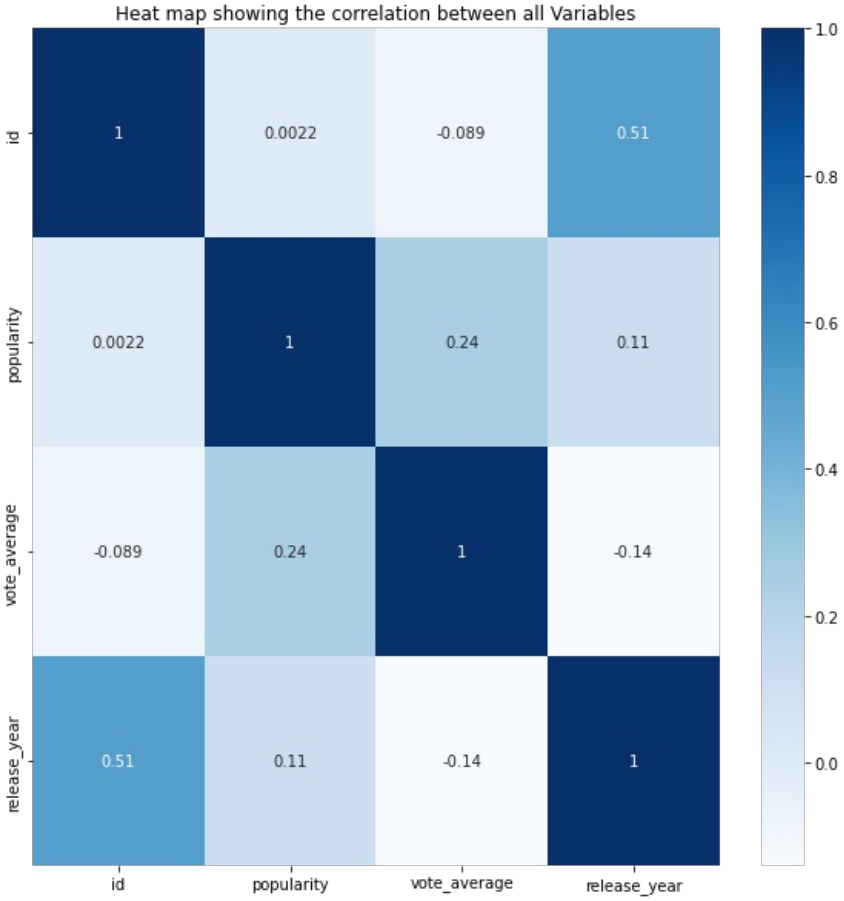
The dataset now has no null values, zero values, duplicates or columns not necessary to our analysis. Now we can proceed to answering our questions with the aid of visuals.

Exploratory Data Analysis

> In this section all the questions posed will be answered with proper visualization.

First, let's explore the relationship between all variables using the heatmap plot.

In [23]:
```
#seaborn plot of the heatmap set to colour blue
plt.figure(figsize=(10,10))
sns.heatmap(df.corr(),cbar=True,annot=True,cmap='Blues')
plt.title('Heat map showing the correlation between all Variables');
```



From these we can see the two kinds of correlation between variables on display.

Positive correlation are as follows:

1. Popularity - Vote Average and Release year
2. Vote Average - Popularity
3. Release year - Popularity

And Negative correlation:

1. Release year - Vote Average

1. Do Director choice affect the popularity of movies?

Lets get the top 20 most popular movies from 1960 to 2015.

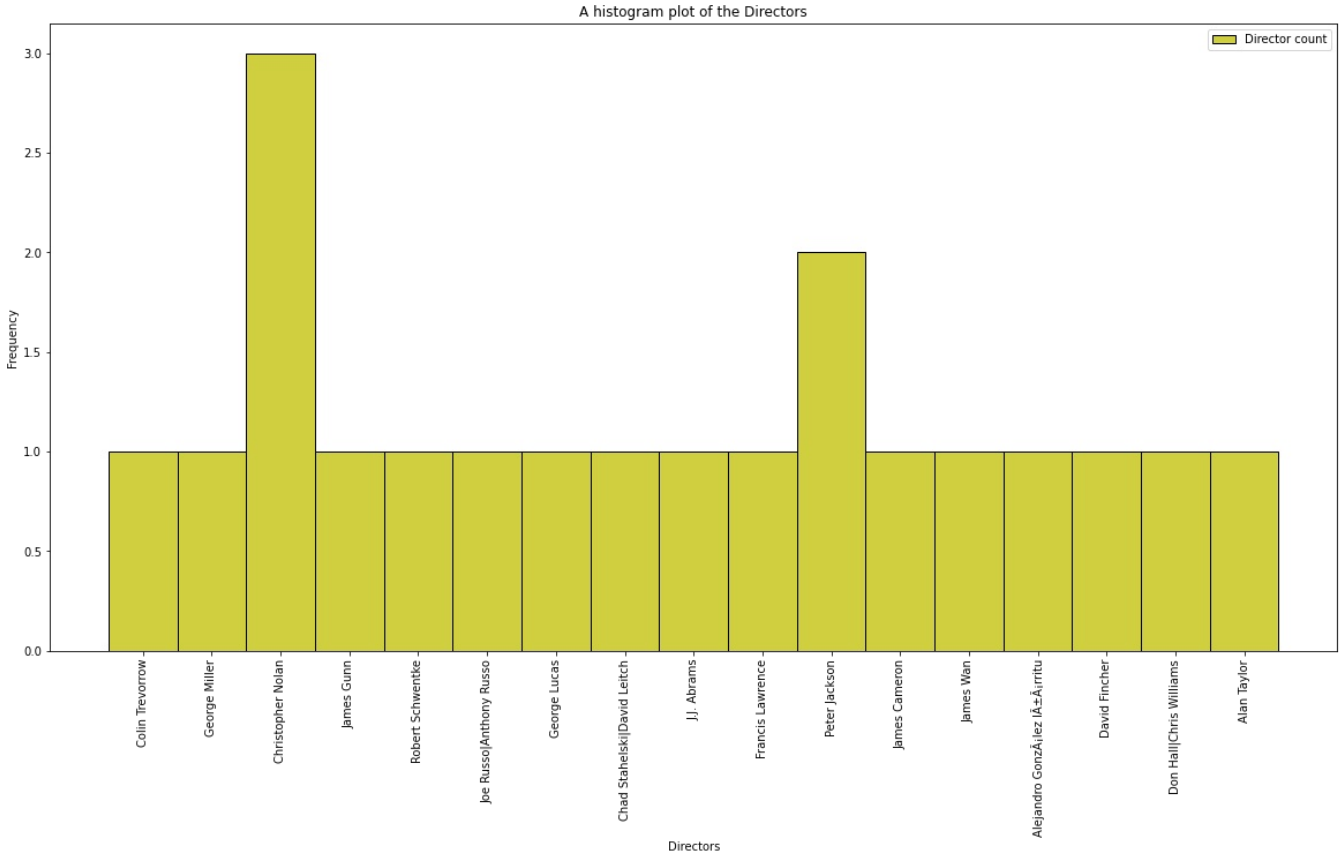
In [24]:
```
#returns the top 20 viral movies of the data set
top_20=df.nlargest(n=20, columns=['popularity'])
top_20
```

Out[24]:

	id	popularity	original_title	cast	director	genres	production_companies
0	135397	32.985763	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	Colin Trevorrow	Action|Adventure|Science Fiction|Thriller	Universal Studios|Amblin Entertainment|Legenda...
1	76341	28.419936	Mad Max: Fury Road	Tom Hardy|Charlize Theron|Hugh Keays-Byrne|Nic...	George Miller	Action|Adventure|Science Fiction|Thriller	Village Roadshow Pictures|Kennedy Miller Produ...
629	157336	24.949134	Interstellar	Matthew McConaughey|Jessica Chastain|Anne Hath...	Christopher Nolan	Adventure|Drama|Science Fiction	Paramount Pictures|Legendary Pictures|Warner B...
630	118340	14.311205	Guardians of the Galaxy	Chris Pratt|Zoe Saldana|Dave Bautista|Vin Dies...	James Gunn	Action|Science Fiction|Adventure	Marvel Studios|Moving Picture Company (MPC)|Bu...
2	262500	13.112507	Insurgent	Shailene Woodley|Theo James|Kate Winslet|Ansel...	Robert Schwentke	Adventure|Science Fiction|Thriller	Summit Entertainment|Mandeville Films|Red Wago...
631	100402	12.971027	Captain America: The Winter Soldier	Chris Evans|Scarlett Johansson|Sebastian Stan|...	Joe Russo|Anthony Russo	Action|Adventure|Science Fiction	Marvel Studios
1329	11	12.037933	Star Wars	Mark Hamill|Harrison Ford|Carrie Fisher|Peter ...	George Lucas	Adventure|Action|Science Fiction	Lucasfilm|Twentieth Century Fox Film Corporation
632	245891	11.422751	John Wick	Keanu Reeves|Michael Nyqvist|Alfie Allen|Wille...	Chad Stahelski|David Leitch	Action|Thriller	Thunder Road Pictures|Warner Bros.|87Eleven|De...
3	140607	11.173104	Star Wars: The Force Awakens	Harrison Ford|Mark Hamill|Carrie Fisher|Adam D...	J.J. Abrams	Action|Adventure|Science Fiction|Fantasy	Lucasfilm|Truenorth Productions|Bad Robot
633	131631	10.739009	The Hunger Games: Mockingjay - Part 1	Jennifer Lawrence|Josh Hutcherson|Liam Hemswor...	Francis Lawrence	Science Fiction|Adventure|Thriller	Lionsgate|Color Force
634	122917	10.174599	The Hobbit: The Battle of the Five Armies	Martin Freeman|Ian McKellen|Richard Armitage|K...	Peter Jackson	Adventure|Fantasy	WingNut Films|New Line Cinema|3Foot7|Metro-Gol...
1386	19995	9.432768	Avatar	Sam Worthington|Zoe Saldana|Sigourney Weaver|S...	James Cameron	Action|Adventure|Fantasy|Science Fiction	Ingenious Film Partners|Twentieth Century Fox ...
1919	27205	9.363643	Inception	Leonardo DiCaprio|Joseph Gordon-Levitt|Ellen P...	Christopher Nolan	Action|Thriller|Science Fiction|Mystery|Adventure	Legendary Pictures|Warner Bros.|Syncopy
4	168259	9.335014	Furious 7	Vin Diesel|Paul Walker|Jason Statham|Michelle ...	James Wan	Action|Crime|Thriller	Universal Pictures|Original Film|Media Rights ...
5	281957	9.110700	The Revenant	Leonardo DiCaprio|Tom Hardy|Will Poulter|Domhn...	Alejandro GonzÃ¡lez IÃ±Ã¡rritu	Western|Drama|Adventure|Thriller	Regency Enterprises|Appian Way|CatchPlay|Anony...
2409	550	8.947905	Fight Club	Edward Norton|Brad Pitt|Meat Loaf|Jared Leto|H...	David Fincher	Drama	Regency Enterprises|Fox 2000 Pictures|Taurus F...
635	177572	8.691294	Big Hero 6	Scott Adsit|Ryan Potter|Daniel Henney|T.J. Mil...	Don Hall|Chris Williams	Adventure|Family|Animation|Action|Comedy	Walt Disney Pictures|Walt Disney Animation Stu...
6	87101	8.654359	Terminator Genisys	Arnold Schwarzenegger|Jason Clarke|Emilia Clar...	Alan Taylor	Science Fiction|Action|Thriller|Adventure	Paramount Pictures|Skydance Productions
2633	120	8.575419	The Lord of the Rings: The Fellowship of the Ring	Elijah Wood|Ian McKellen|Viggo Mortensen|Liv T...	Peter Jackson	Adventure|Fantasy|Action	WingNut Films|New Line Cinema|The Saul Zaentz ...
2875	155	8.466668	The Dark Knight	Christian Bale|Michael Caine|Heath Ledger|Aaro...	Christopher Nolan	Drama|Action|Crime|Thriller	DC Comics|Legendary Pictures|Warner Bros.|Syncopy

In [25]:

```
# returns the count of directors in the top 20 popular movies
plt.figure(figsize=(20,10))
plt.title('A histogram plot of the Directors')
plt.xlabel('Directors')
plt.ylabel('Frequency')
sns.histplot(top_20.director, color='y', label='Director count')
plt.xticks(rotation=90)
plt.legend();
```



Chriatopher Nolan and Peter Jackson have three and two movies respectively movies in the top 20 movies of all time, the highest in relation to other directors.

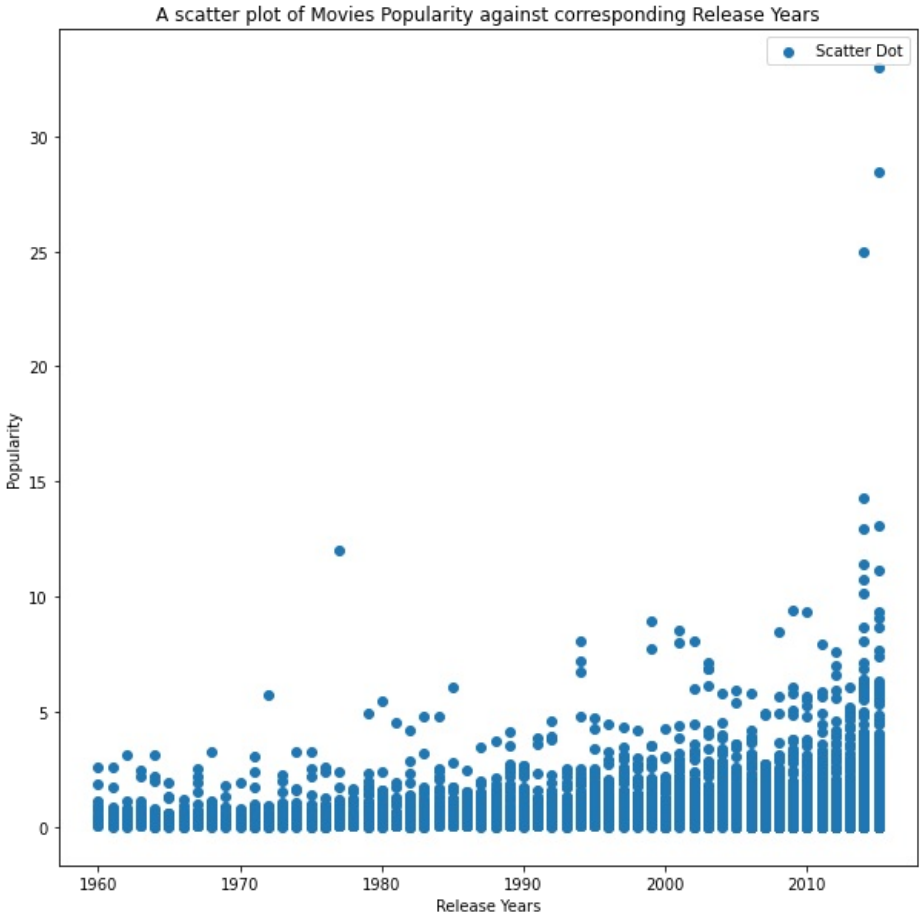
2. Is there a relationship between the year of release and the popularity of movies?

I would be conducting a few scatter plots,therefore I would define a 'draw_scatter_plot' function below, this is done to save time and avoid code repetition.

In [51]:
```
def draw_scatter_plot(df,x,y,l,title,xlabel,ylabel):
    "This returns a scatter plot"
    plt.figure(figsize=(10,10))
    plt.scatter(x=x,y=y,data=df, label=l)
    plt.title(title)
    plt.xlabel(xlabel)
    plt.ylabel(ylabel)
    plt.legend(loc='best')
    return;
```

Now I'd proceed to do a scatter plot of the movie release year against their popularity score.

In [49]:
```
draw_scatter_plot(df,'release_year','popularity','Scatter Dot','A scatter plot of Movies Popularity against cor
```

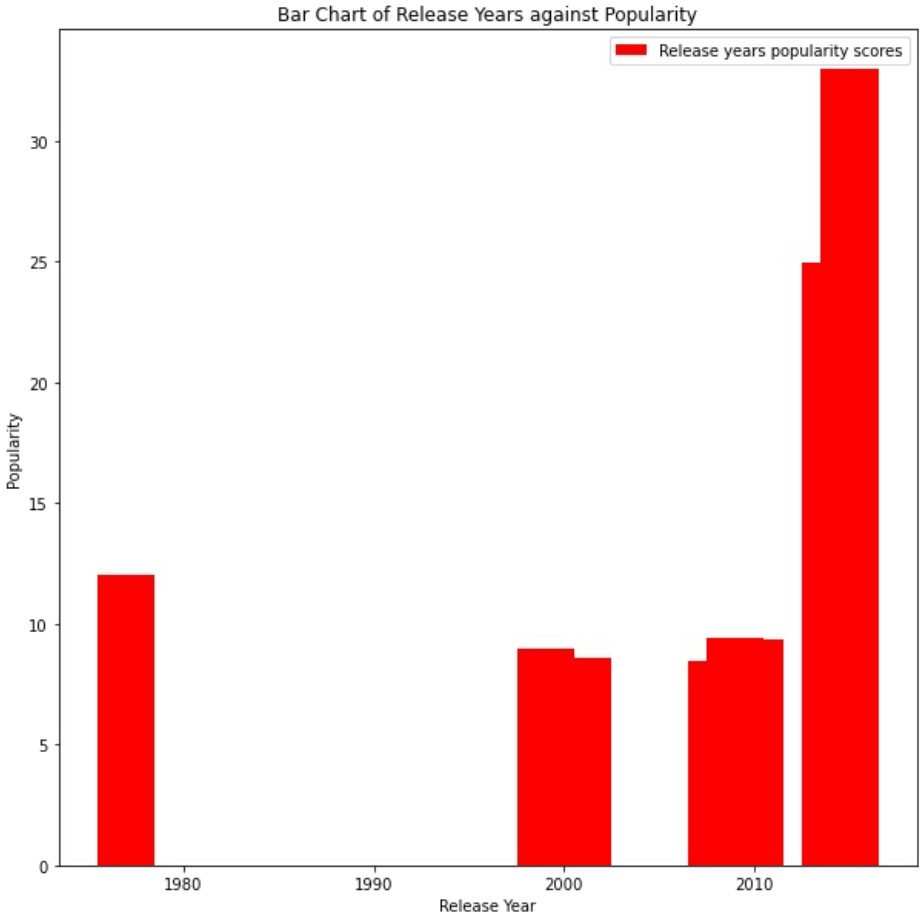


In [27]:
```
# returns the unique years present in the dataset
df.release_year.unique()
```

Out[27]:
```
array([2015, 2014, 1977, 2009, 2010, 1999, 2001, 2008, 2011, 2002, 1994,
       2012, 2003, 1997, 2013, 1985, 2005, 2006, 2004, 1972, 1980, 2007,
       1979, 1984, 1983, 1995, 1992, 1981, 1996, 2000, 1982, 1998, 1989,
       1991, 1988, 1987, 1968, 1974, 1975, 1962, 1964, 1971, 1990, 1961,
       1960, 1976, 1993, 1967, 1963, 1986, 1973, 1970, 1965, 1969, 1978,
       1966], dtype=int64)
```

From the scatter plot we can see that movies released got popular as the years increased (Positive Correlation),the most popular movies were released in the 2000s. And the peak appears to be in the most recent year which is 2015(the upper limit). Let's explore the data further by plotting the top 20 most popular movies against their release year.

In [28]:
```
plt.figure(figsize=(10,10))
plt.title('Bar Chart of Release Years against Popularity')
plt.bar(x='release_year',height='popularity',width=3,data=top_20, color='r', label='Release years popularity sc
plt.xlabel('Release Year')
plt.ylabel('Popularity')
plt.legend();
```



From the plot we can see that the most popular movies still are released in the 2000s. Could it be as a result of the genres of the movies released in the 2000s?

3. What genre of movies got popular over the years?

Lets visualize the genres of the most popular movies.

In [29]:
```
#returns the unique genres of the most popular movies
top_20.genres.unique()
```

Out[29]:
```
array(['Action|Adventure|Science Fiction|Thriller',
       'Adventure|Drama|Science Fiction',
       'Action|Science Fiction|Adventure',
       'Adventure|Science Fiction|Thriller',
       'Action|Adventure|Science Fiction',
       'Adventure|Action|Science Fiction', 'Action|Thriller',
       'Action|Adventure|Science Fiction|Fantasy',
       'Science Fiction|Adventure|Thriller', 'Adventure|Fantasy',
       'Action|Adventure|Fantasy|Science Fiction',
       'Action|Thriller|Science Fiction|Mystery|Adventure',
       'Action|Crime|Thriller', 'Western|Drama|Adventure|Thriller',
       'Drama', 'Adventure|Family|Animation|Action|Comedy',
       'Science Fiction|Action|Thriller|Adventure',
       'Adventure|Fantasy|Action', 'Drama|Action|Crime|Thriller'],
      dtype=object)
```

To plot the frequency of these genres in the top 20 popular movies, we have to do a split of the genres column. There's a common seperator "|", therefore I'd do a split by it.

In [30]:
```
genres1 = top_20.copy()
genres2 = top_20.copy()
genres3 = top_20.copy()
genres4 = top_20.copy()
```

In [31]:
```
# columns to split by "|"
split_columns = ['genres']

# applying string split function to each column of each dataframe copy
for c in split_columns:
    genres1[c] = genres1[c].str.split('|').str[0]
    genres2[c] = genres2[c].str.split('|').str[1]
    genres3[c] = genres3[c].str.split('|').str[2]
    genres4[c] = genres4[c].str.split('|').str[3]
```

In [32]:
```
#combine each of the new dataframes into one
new_genre_df = pd.concat([genres1, genres2, genres3, genres4], ignore_index=True)
```

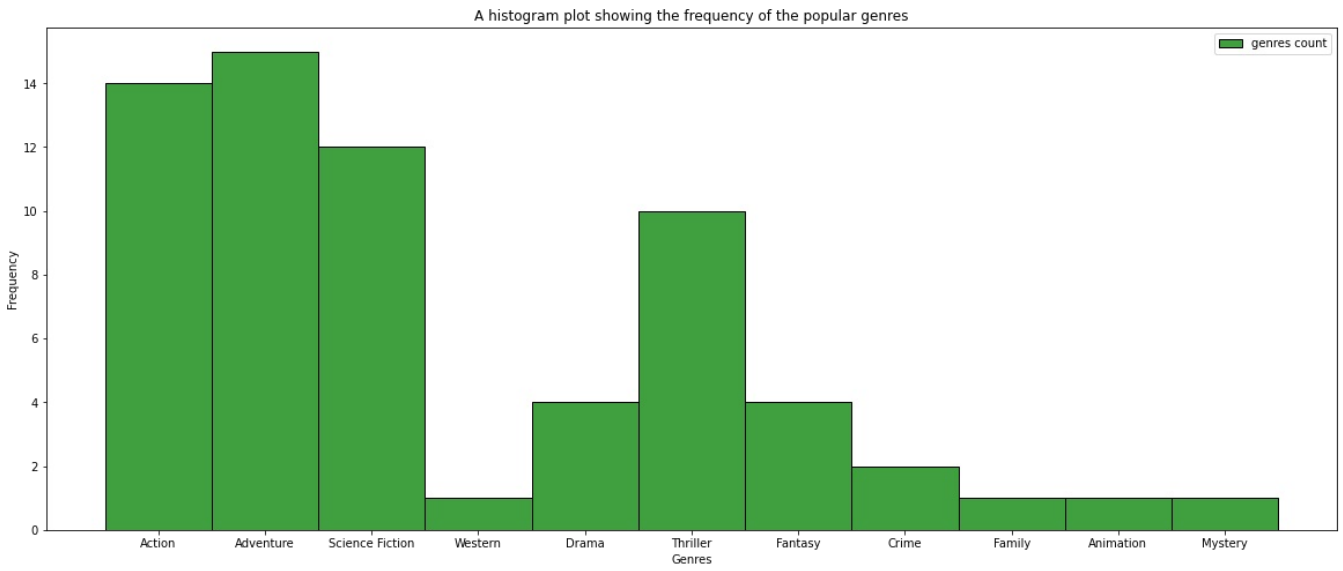
```
new_genre_df
```

Out[32]:

	id	popularity	original_title	cast	director	genres	production_companies	vote_average	release_year
0	135397	32.985763	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	Colin Trevorrow	Action	Universal Studios|Amblin Entertainment|Legenda...	6.5	2015
1	76341	28.419936	Mad Max: Fury Road	Tom Hardy|Charlize Theron|Hugh Keays-Byrne|Nic...	George Miller	Action	Village Roadshow Pictures|Kennedy Miller Produ...	7.1	2015
2	157336	24.949134	Interstellar	Matthew McConaughey|Jessica Chastain|Anne Hath...	Christopher Nolan	Adventure	Paramount Pictures|Legendary Pictures|Warner B...	8.0	2014
3	118340	14.311205	Guardians of the Galaxy	Chris Pratt|Zoe Saldana|Dave Bautista|Vin Dies...	James Gunn	Action	Marvel Studios|Moving Picture Company (MPC)|Bu...	7.9	2014
4	262500	13.112507	Insurgent	Shailene Woodley|Theo James|Kate Winslet|Ansel...	Robert Schwentke	Adventure	Summit Entertainment|Mandeville Films|Red Wago...	6.3	2015
...	...	...	...	...	...	...	...	...	...
75	550	8.947905	Fight Club	Edward Norton|Brad Pitt|Meat Loaf|Jared Leto|H...	David Fincher	NaN	Regency Enterprises|Fox 2000 Pictures|Taurus F...	8.1	1999
76	177572	8.691294	Big Hero 6	Scott Adsit|Ryan Potter|Daniel Henney|T.J. Mil...	Don Hall|Chris Williams	Action	Walt Disney Pictures|Walt Disney Animation Stu...	7.8	2014
77	87101	8.654359	Terminator Genisys	Arnold Schwarzenegger|Jason Clarke|Emilia Clar...	Alan Taylor	Adventure	Paramount Pictures|Skydance Productions	5.8	2015
78	120	8.575419	The Lord of the Rings: The Fellowship of the Ring	Elijah Wood|Ian McKellen|Viggo Mortensen|Liv T...	Peter Jackson	NaN	WingNut Films|New Line Cinema|The Saul Zaentz ...	7.8	2001
79	155	8.466668	The Dark Knight	Christian Bale|Michael Caine|Heath Ledger|Aaro...	Christopher Nolan	Thriller	DC Comics|Legendary Pictures|Warner Bros.|Syncopy	8.1	2008

80 rows × 9 columns

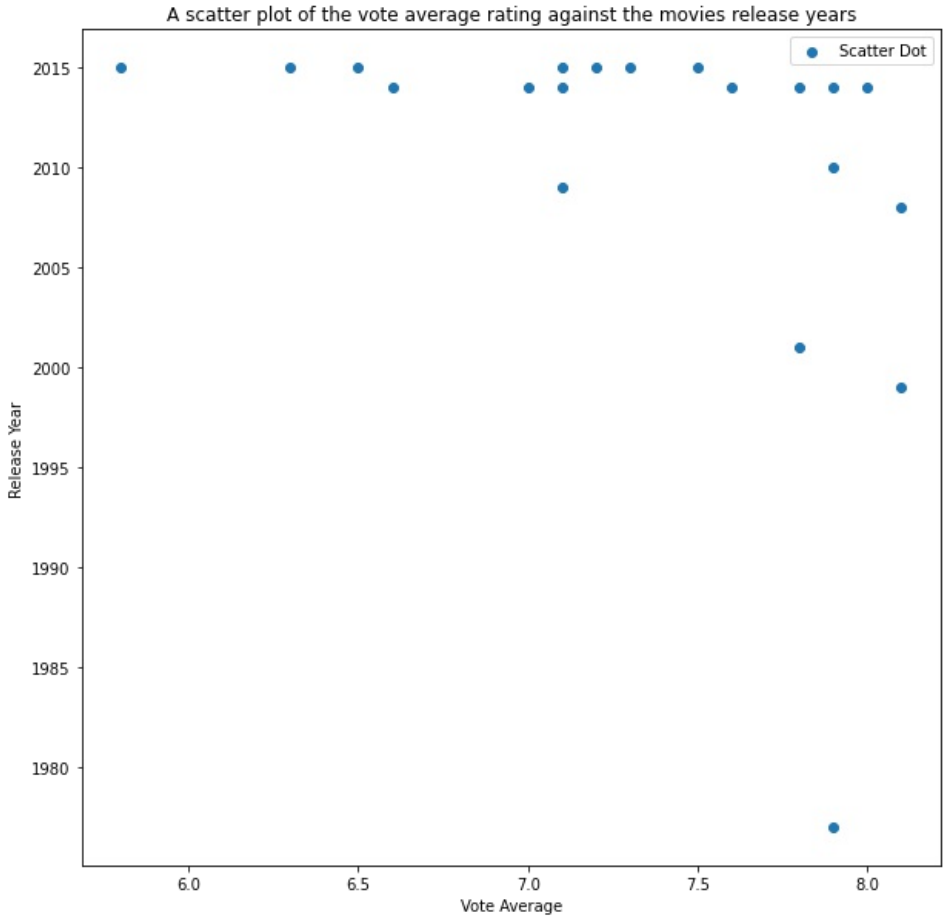
In [33]:
```
#histogram plot of the genre frequncy
plt.figure(figsize=(20,8))
sns.histplot(new_genre_df.genres,bins=20, color='g', label='genres count')
plt.title('A histogram plot showing the frequency of the popular genres')
plt.xlabel('Genres')
plt.ylabel('Frequency')
plt.legend();
```



The most popular genres as we moved towards the 2000s were Action, Adventure, Science Fiction, and/or Thriller.

4. How did people rate the popular movies?

In [52]:
```
# a scatter plot of the vote average rating against the release years of the movies
draw_scatter_plot(top_20,'vote_average','release_year','Scatter Dot','A scatter plot of the vote average rating
```



The vote average of movies increased with decrease in years. That's a negative correlation,and a little shocking seeing that movies got more popular over the years.

Conclusions

From the analysis concluded I'd say ;

1. There is a positive correlation between the director choice and the popularity of movies. Therefore I'd advice that if you want your movie to go viral, you hire Christopher Nolan to direct it.
2. There is also a positive relationship between the release years and the popularity of the movies, but the real reason was not explored in this report.
3. The most popular movies appeared in the 2000s and they had quite a good number of genres in common, the genre definitely affects the popularity of a movie. General viewers tend to have high interest in Action, Adventure, Science Fiction, and/or Thriller.
4. Although, the movies got popular/viral as the year increased, it is also interesting to note that the highest viewers ratings came from earlier years.

Limitations

1. General viewers tend to have high interest in Action, Adventure, Science Fiction, and/or Thriller as stated earlier, but this might not be entirely factual as I didn't explore a larger sample size other than the top 20 popular movies.
2. This dataset does not account for factors like nostalgia and I didn't explore the 'vote_count' column, therefore it would be difficult to ascertain why although movies got popular as the years increased the best viewer's rating came from earlier years.
3. I can not conclude totally that the director choice and release years are what make a movie go viral, as I did not analyse important features like cast and/or budget which would have an impact on a movies popularity.

In [35]:
```
from subprocess import call
call(['python', '-m', 'nbconvert', 'Investigating_the_TMDb_Movie_Dataset.ipynb'])
```

Out[35]:
```
1
```

In [ ]:
```

```