investigate-a-dataset tmdb

January 12, 2023

> **Tip**: Welcome to the Investigate a Dataset project! You will find tips in quoted sections like this to help organize your approach to your investigation. Before submitting your project, it will be a good idea to go back through your report and remove these sections to make the presentation of your work as tidy as possible. First things first, you might want to double-click this Markdown cell and change the title so that it reflects your dataset and investigation.

1 Project: Soccer Database

1.1 Table of Contents

## Introduction

> **Tip**: In this section of the report, provide a brief introduction to the dataset you've selected for analysis. At the end of this section, describe the questions that you plan on exploring over the course of the report. Try to build your report around the analysis of at least one dependent variable and three independent variables.
>
> If you haven't yet selected and downloaded your data, make sure you do that first before coming back here. If you're not sure what questions to ask right now, then make sure you familiarize yourself with the variables and the dataset context for ideas of what to explore.

[356]:
```
# Use this cell to set up import statements for all of the packages that you
#   plan to use.

# 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
import operator
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

```
%matplotlib inline
```

1.1.1

1.2 Data Wrangling

Tip: In this section of the report, you will load in the data, check for cleanliness, and then trim and clean your dataset for analysis. Make sure that you document your steps carefully and justify your cleaning decisions.

1.2.1 General Properties

1.2.2 Reading the Data:

[357]:
```
df = pd.read_csv('tmdb-movies.csv')
df
```

[357]:
```
           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
…         …          …          …          …           …
10861      21  tt0060371    0.080598          0           0
10862   20379  tt0060472    0.065543          0           0
10863   39768  tt0060161    0.065141          0           0
10864   21449  tt0061177    0.064317          0           0
10865   22293  tt0060666    0.035919      19000           0

                 original_title  \
0                Jurassic World
1            Mad Max: Fury Road
2                     Insurgent
3  Star Wars: The Force Awakens
4                     Furious 7
…                           …
10861        The Endless Summer
10862                Grand Prix
10863       Beregis Avtomobilya
10864     What's Up, Tiger Lily?
10865   Manos: The Hands of Fate

                                                  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 …
…                                                 …
10861  Michael Hynson|Robert August|Lord 'Tally Ho' B…
10862  James Garner|Eva Marie Saint|Yves Montand|Tosh…
10863  Innokentiy Smoktunovskiy|Oleg Efremov|Georgi Z…
10864  Tatsuya Mihashi|Akiko Wakabayashi|Mie Hama|Joh…
10865  Harold P. Warren|Tom Neyman|John Reynolds|Dian…

                                              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
…                                                 …                …
10861                                              NaN        Bruce Brown
10862                                              NaN  John Frankenheimer
10863                                              NaN      Eldar Ryazanov
10864                                              NaN        Woody Allen
10865                                              NaN    Harold P. Warren

                                               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  …
…                                                 …  …
10861                                              NaN  …
10862  Cinerama sweeps YOU into a drama of speed and …  …
10863                                              NaN  …
10864                           WOODY ALLEN STRIKES BACK!  …
10865       It's Shocking! It's Beyond Your Imagination!  …

                                              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
…                                                 …     …
10861  The Endless Summer, by Bruce Brown, is one of …      95
10862  Grand Prix driver Pete Aron is fired by his te…     176
10863  An insurance agent who moonlights as a carthie…      94
10864  In comic Woody Allen's film debut, he took the…      80
10865  A family gets lost on the road and stumbles up…      74
```

```
                                             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
…                                              …
10861                                Documentary
10862                     Action|Adventure|Drama
10863                             Mystery|Comedy
10864                              Action|Comedy
10865                                     Horror

                                      production_companies release_date  \
0      Universal Studios|Amblin Entertainment|Legenda…       6/9/15
1      Village Roadshow Pictures|Kennedy Miller Produ…      5/13/15
2      Summit Entertainment|Mandeville Films|Red Wago…      3/18/15
3              Lucasfilm|Truenorth Productions|Bad Robot     12/15/15
4      Universal Pictures|Original Film|Media Rights …       4/1/15
…                                                    …          …
10861                                Bruce Brown Films      6/15/66
10862  Cherokee Productions|Joel Productions|Douglas …     12/21/66
10863                                         Mosfilm       1/1/66
10864                            Benedict Pictures Corp.      11/2/66
10865                                       Norm-Iris     11/15/66

      vote_count  vote_average  release_year    budget_adj   revenue_adj
0           5562           6.5          2015  1.379999e+08  1.392446e+09
1           6185           7.1          2015  1.379999e+08  3.481613e+08
2           2480           6.3          2015  1.012000e+08  2.716190e+08
3           5292           7.5          2015  1.839999e+08  1.902723e+09
4           2947           7.3          2015  1.747999e+08  1.385749e+09
…            …             …            …             …             …
10861         11           7.4          1966  0.000000e+00  0.000000e+00
10862         20           5.7          1966  0.000000e+00  0.000000e+00
10863         11           6.5          1966  0.000000e+00  0.000000e+00
10864         22           5.4          1966  0.000000e+00  0.000000e+00
10865         15           1.5          1966  1.276423e+05  0.000000e+00

[10866 rows x 21 columns]
```

1.2.3 Printing the Data's data type

[358]:
```
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
```

Load your data and print out a few lines. Perform operations to inspect data

2 types and look for instances of missing or possibly errant data.

> **Tip**: You should *not* perform too many operations in each cell. Create cells freely to explore your data. One option that you can take with this project is to do a lot of explorations in an initial notebook. These don't have to be organized, but make sure you use enough comments to understand the purpose of each code cell. Then, after you're done with your analysis, create a duplicate notebook where you will trim the excess and organize your steps so that you have a flowing, cohesive report.

> **Tip**: Make sure that you keep your reader informed on the steps that you are taking in your investigation. Follow every code cell, or every set of related code cells, with a markdown cell to describe to the reader what was found in the preceding cell(s). Try to make it so that the reader can then understand what they will be seeing in the following cell(s).

2.0.1 Data Cleaning (Replace this with more specific notes!)

[359]:
```
# Display the number of missing values for each column .
df.isnull().sum()
```

[359]:
```
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
```

[360]:
```
# explore the dulicated items .
df.duplicated().sum()
```

[360]:
```
1
```

[361]:
```
df[df.duplicated()]
```

[361]:
```
         id    imdb_id  popularity    budget  revenue original_title  \
2090  42194  tt0411951     0.59643  30000000   967000         TEKKEN


                                                   cast homepage  \
2090  Jon Foo|Kelly Overton|Cary-Hiroyuki Tagawa|Ian…      NaN

              director              tagline  …  \
2090  Dwight H. Little  Survival is no game  …


                                               overview runtime  \
2090  In the year of 2039, after World Wars destroy …      92

                                           genres    production_companies  \
2090  Crime|Drama|Action|Thriller|Science Fiction  Namco|Light Song Films

     release_date vote_count  vote_average  release_year  budget_adj  \
2090      3/20/10        110           5.0          2010  30000000.0

      revenue_adj
2090     967000.0

[1 rows x 21 columns]
```

2.0.2 it's okay to keep the dublicated values

## Exploratory Data Analysis

> **Tip**: Now that you've trimmed and cleaned your data, you're ready to move on to exploration. Compute statistics and create visualizations with the goal of addressing the research questions that you posed in the Introduction section. It is recommended that you be systematic with your approach. Look at one variable at a time, and then follow it up by looking at relationships between variables.

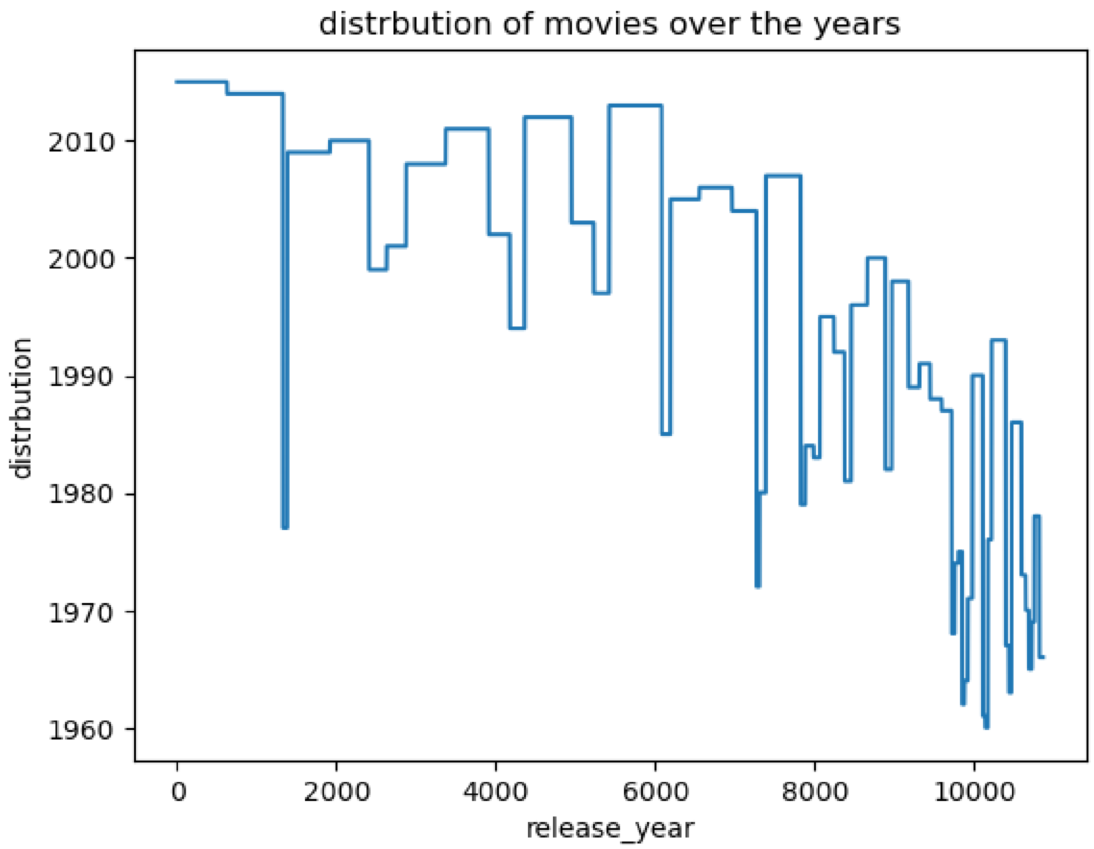
2.0.3 Research Question 1 (What's the most popular genres over years?)

2.0.4 summary statistics

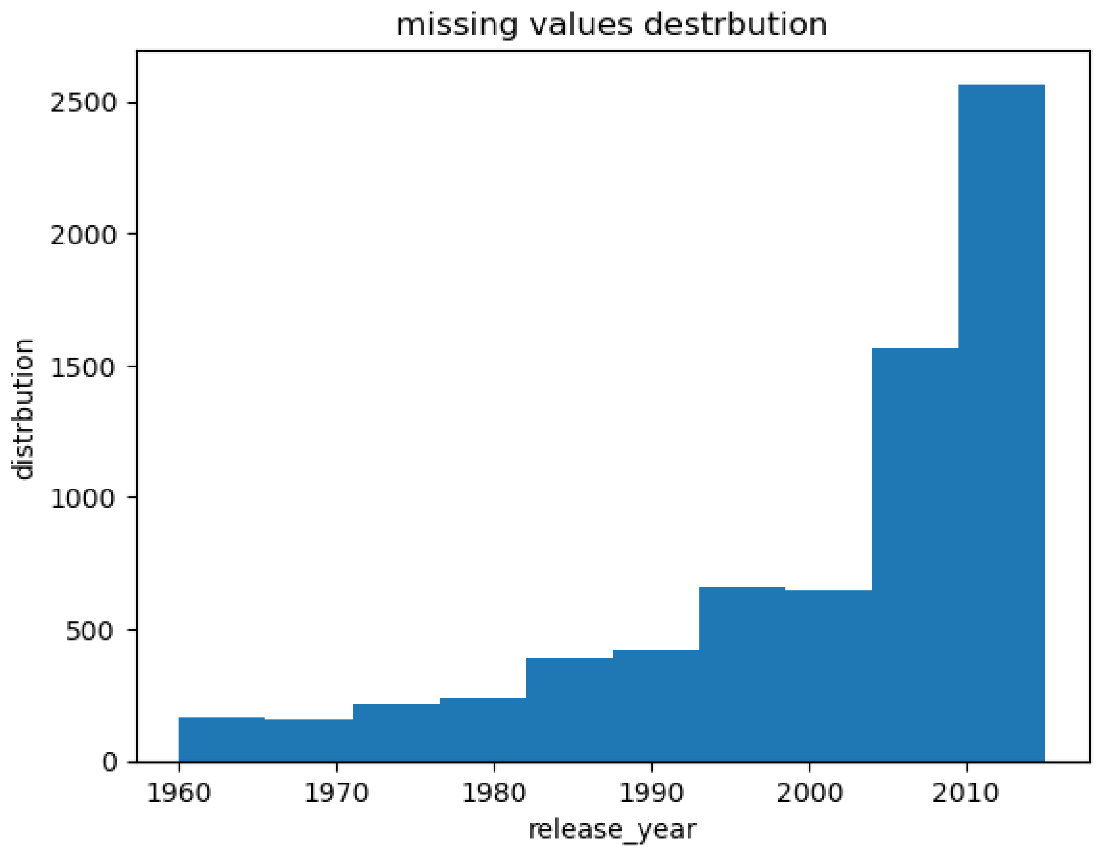
[362]:
```
# Display summary statistics for the dataset
df.describe()
```

[362]:
```
                  id    popularity        budget       revenue       runtime  \
count   10866.000000  10866.000000  1.086600e+04  1.086600e+04  10866.000000
mean    66064.177434      0.646441  1.462570e+07  3.982332e+07    102.070863
std     92130.136561      1.000185  3.091321e+07  1.170035e+08     31.381405
min         5.000000      0.000065  0.000000e+00  0.000000e+00      0.000000
25%     10596.250000      0.207583  0.000000e+00  0.000000e+00     90.000000
50%     20669.000000      0.383856  0.000000e+00  0.000000e+00     99.000000
75%     75610.000000      0.713817  1.500000e+07  2.400000e+07    111.000000
max    417859.000000     32.985763  4.250000e+08  2.781506e+09    900.000000

         vote_count  vote_average  release_year    budget_adj   revenue_adj
count  10866.000000  10866.000000  10866.000000  1.086600e+04  1.086600e+04
mean     217.389748      5.974922   2001.322658  1.755104e+07  5.136436e+07
std      575.619058      0.935142     12.812941  3.430616e+07  1.446325e+08
min       10.000000      1.500000   1960.000000  0.000000e+00  0.000000e+00
25%       17.000000      5.400000   1995.000000  0.000000e+00  0.000000e+00
50%       38.000000      6.000000   2006.000000  0.000000e+00  0.000000e+00
75%      145.750000      6.600000   2011.000000  2.085325e+07  3.369710e+07
max     9767.000000      9.200000   2015.000000  4.250000e+08  2.827124e+09
```

[363]:
```
df.release_year.plot(kind='line',x= "distrbution",y= "release_year");
plt.title('distrbution of movies over the years')
plt.xlabel("release_year")
plt.ylabel("distrbution");
```



[364]:
```
# Missing values distrbution in (revenue,budget,runtime) across the years

zero=df[(df.revenue == 0)|(df.budget == 0)|(df.runtime == 0)]
zero.release_year.plot(kind='hist');
plt.title('missing values destrbution')
plt.xlabel("release_year")
plt.ylabel("distrbution");
```



2.0.5 what is the count of each movie genres & cast

```
[365]: display(df.genres.value_counts())
print('-'*50)
display(df.cast.value_counts())
```

```
Comedy                                        712
Drama                                         712
Documentary                                   312
Drama|Romance                                 289
Comedy|Drama                                  280
                                             …
Adventure|Animation|Romance                     1
Family|Animation|Drama                          1
Action|Adventure|Animation|Comedy|Family        1
Action|Adventure|Animation|Fantasy              1
Mystery|Science Fiction|Thriller|Drama          1
Name: genres, Length: 2039, dtype: int64

--------------------------------------------------
```

```
Louis C.K.                                                                  ␣
  ↪ 6
William Shatner|Leonard Nimoy|DeForest Kelley|James Doohan|George Takei     ␣
  ↪ 5
Bill Burr                                                                   ␣
  ↪ 4
Aziz Ansari                                                                 ␣
  ↪ 3
Elijah Wood|Ian McKellen|Viggo Mortensen|Liv Tyler|Orlando Bloom            ␣
  ↪ 3
                                                                            ␣
  ↪..
Ray Stevenson|Vincent D'Onofrio|Val Kilmer|Christopher Walken|Linda Cardellini ␣
  ↪ 1
Freida Pinto|Riz Ahmed|Roshan Seth|Kalki Koechlin|Anurag Kashyap            ␣
  ↪ 1
William Hurt|Paul Giamatti|James Woods|Billy Crudup|Topher Grace            ␣
  ↪ 1
Dennis Quaid|Tony Oller|Aimee Teegarden|Stephen Lunsford|Devon Werkheiser   ␣
  ↪ 1
Harold P. Warren|Tom Neyman|John Reynolds|Diane Mahree|Stephanie Nielson    ␣
  ↪ 1
Name: cast, Length: 10719, dtype: int64
```

[366]:
```
max(df.cast.value_counts())
```

[366]:
```
6
```

2.0.6 drop any missing values

[367]:
```
df.dropna(inplace = True)
```

2.0.7 drop zero values

[368]:
```
zero_data = df[(df.revenue_adj == 0)|(df.budget_adj == 0)|(df.runtime == 0)]
df.drop(zero_data.index,inplace=True)
df.head()
```

[368]:
```
       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]
```

[369]:
```
# Descriptive statistics for cleaned dataset
df.describe()
```

[369]:
```
                  id   popularity        budget       revenue      runtime  \
count    1287.000000  1287.000000  1.287000e+03  1.287000e+03  1287.000000
mean    52557.491064     1.786022  5.200349e+07  1.762444e+08   110.273504
std     74450.077163     2.172137  5.514540e+07  2.538156e+08    18.811369
min        11.000000     0.010335  1.000000e+00  4.300000e+01    63.000000
25%      5851.500000     0.664783  1.400000e+07  2.565097e+07    97.000000
50%     20178.000000     1.152354  3.200000e+07  8.208716e+07   107.000000
75%     62209.500000     2.125342  7.000000e+07  2.140694e+08   121.000000
max    333348.000000    32.985763  4.250000e+08  2.781506e+09   201.000000

        vote_count  vote_average  release_year    budget_adj   revenue_adj
count  1287.000000   1287.000000   1287.000000  1.287000e+03  1.287000e+03
mean    947.266511      6.279487   2007.017094  5.462994e+07  1.991775e+08
std    1255.476215      0.795955      8.060503  5.525463e+07  2.968515e+08
min      10.000000      2.200000   1961.000000  9.693980e-01  4.300000e+01
25%     179.000000      5.800000   2005.000000  1.519180e+07  2.764890e+07
50%     439.000000      6.300000   2009.000000  3.556927e+07  8.674770e+07
75%    1173.000000      6.800000   2011.000000  7.630125e+07  2.351178e+08
max    9767.000000      8.300000   2015.000000  4.250000e+08  2.827124e+09
```

2.0.8 4.Sorting release date into decades for Exploratory analysis by using pd.cut() function.

[370]:
```
bins_edges=[1960,1970,1980,1990,2000,2010,2015]
bins_names=['1960s','1970s','1980s','1990s','2000s','2010s']
df.release_year = pd.cut(df.release_year, bins_edges, labels = bins_names)
df.release_year.value_counts()
```

[370]:
```
2000s    656
2010s    472
1990s     95
1980s     35
1970s     21
1960s      8
Name: release_year, dtype: int64
```

2.0.9 5.Seperate Data contained in Cast & Genres into Multiple values

[371]:
```
def seprate_values(col):
    new_cols=(df[col].str.split('|', expand=True).rename(columns=lambda x:␣
 ↪f"{col}_{x+1}"))
    return new_cols
```

[372]:
```
df_genres = seprate_values('genres')
```

[373]:
```
df_cast = seprate_values('cast')
```

[374]:
```
df['cast'],df['genres']=df_cast['cast_1'],df_genres['genres_1']
```

[375]:
```
display(df['cast'].value_counts().nlargest(10))
print('-'*60)
display(df['genres'].value_counts().nlargest(10))
```

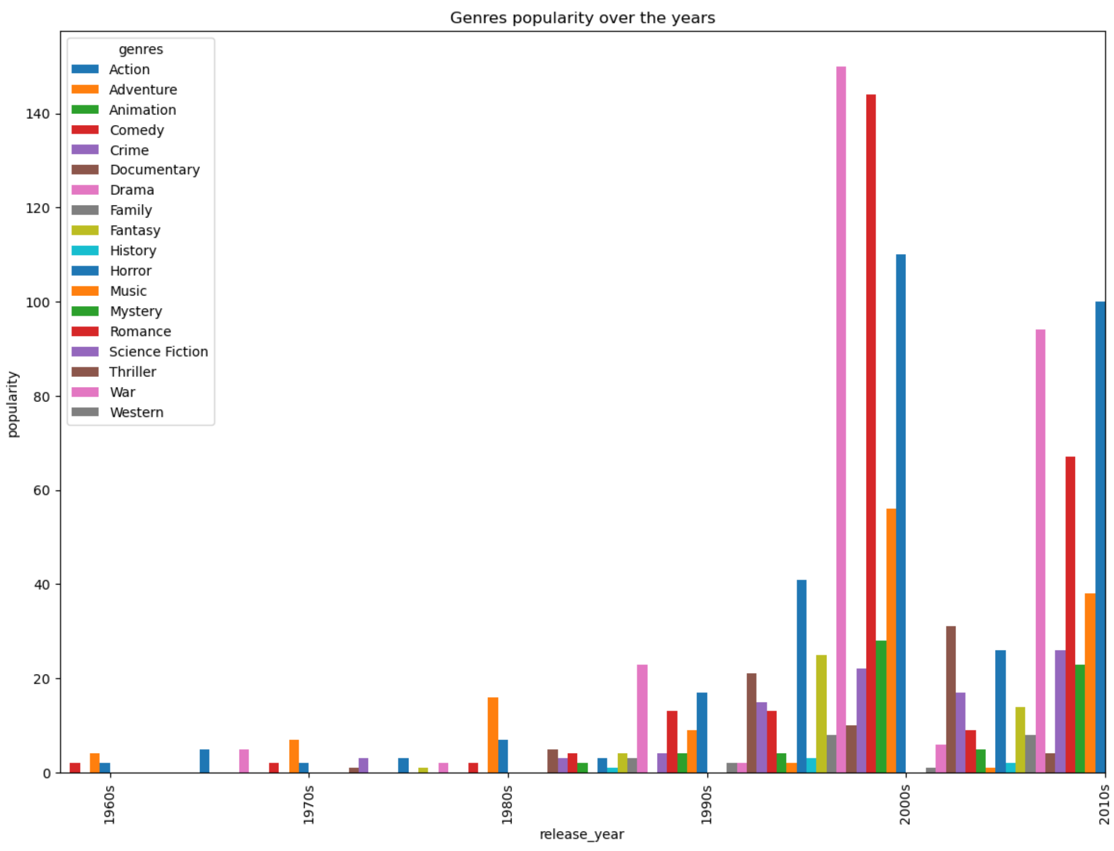
```
Tom Hanks          13
Matt Damon         13
Mark Wahlberg      13
Nicolas Cage       13
Tom Cruise         12
George Clooney     11
Johnny Depp        11
Ben Affleck        10
Hugh Jackman       10
Steve Carell       10
Name: cast, dtype: int64
------------------------------------------------------------

Drama               274
Action              238
Comedy              230
Adventure           130
Horror               78
Thriller             58
Animation            55
Crime                52
Fantasy              44
Science Fiction      38
Name: genres, dtype: int64
```

[376]:
```
df.groupby(["release_year","genres"])['popularity'].size().unstack()
```

[376]:
```
genres         Action  Adventure  Animation  Comedy  Crime  Documentary  Drama  \
release_year
1960s               2          4          0       2      0            0      0
1970s               2          7          0       2      0            0      5
```

```
1980s                 7          16           0        2       0             0      2
1990s                17           9           4       13       4             0     23
2000s               110          56          28      144      22            10    150
2010s               100          38          23       67      26             4     94

genres         Family  Fantasy  History  Horror  Music  Mystery  Romance  \
release_year
1960s               0        0        0       0      0        0        0
1970s               0        0        0       5      0        0        0
1980s               0        1        0       3      0        0        0
1990s               3        4        1       3      0        2        4
2000s               8       25        3      41      2        4       13
2010s               8       14        2      26      1        5        9

genres         Science Fiction  Thriller  War  Western
release_year
1960s                        0         0    0        0
1970s                        0         0    0        0
1980s                        3         1    0        0
1990s                        3         5    0        0
2000s                       15        21    2        2
2010s                       17        31    6        1
```

[387]:
```
fig, ax = plt.subplots(figsize=(14,10))
df.groupby(["release_year","genres"])['popularity'].size().unstack().
 ↪plot(kind='bar',ax=ax,width=-.9,align='edge',title = 'Genres popularity over␣
 ↪the years');
ax.set_ylabel('popularity');
```



The Top Three Genres for each decade are:

- 1960s: Adventure, Action, Comdey.
- 1970s: Drama, Action, Horror, comdey.
- 1980s: Comdey, Drama, Action.
- 1990s: Drama, Comdey, Action.
- 2000s: Drama, Comdey, Action.
- 2010s: Drama, Comdey, Action.

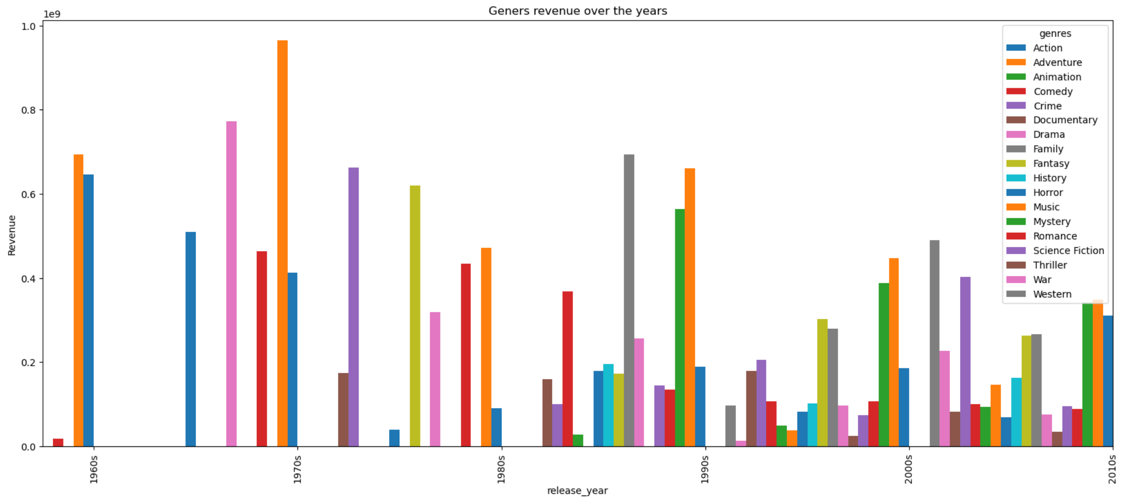
2.0.10 Research Question 2 (Which Genres have The Highest average Revenue over Decades?)

[378]:
```
pd.
↪pivot_table(df,index="release_year",columns="genres",values='revenue_adj',aggfunc=pd.
↪Series.mean)
```

[378]:
```
genres              Action     Adventure     Animation        Comedy  \
release_year
1960s         6.455884e+08  6.930339e+08           NaN  1.810679e+07
```

```
1970s          4.127977e+08  9.646533e+08           NaN  4.643701e+08
1980s          9.065979e+07  4.721432e+08           NaN  4.343464e+08
1990s          1.896920e+08  6.601854e+08  5.639794e+08  1.343173e+08
2000s          1.860770e+08  4.464922e+08  3.881480e+08  1.064945e+08
2010s          3.108455e+08  3.478543e+08  3.425381e+08  8.878601e+07

genres                Crime   Documentary         Drama        Family  \
release_year
1960s                   NaN           NaN           NaN           NaN
1970s                   NaN           NaN  7.732088e+08           NaN
1980s                   NaN           NaN  3.194221e+08           NaN
1990s          1.447832e+08           NaN  2.572276e+08  6.942527e+08
2000s          7.311983e+07  2.447836e+07  9.768604e+07  2.795444e+08
2010s          9.550094e+07  3.522698e+07  7.542016e+07  2.666794e+08

genres              Fantasy       History        Horror         Music  \
release_year
1960s                   NaN           NaN           NaN           NaN
1970s                   NaN           NaN  5.097712e+08           NaN
1980s          6.196634e+08           NaN  3.986553e+07           NaN
1990s          1.730384e+08  1.960861e+08  1.786824e+08           NaN
2000s          3.022301e+08  1.013229e+08  8.172580e+07  3.796679e+07
2010s          2.630345e+08  1.632824e+08  6.864986e+07  1.458037e+08

genres              Mystery       Romance  Science Fiction      Thriller  \
release_year
1960s                   NaN           NaN              NaN           NaN
1970s                   NaN           NaN              NaN           NaN
1980s                   NaN           NaN     6.618831e+08  1.741984e+08
1990s          2.730498e+07  3.685544e+08     1.004535e+08  1.589269e+08
2000s          4.932263e+07  1.068541e+08     2.057858e+08  1.797027e+08
2010s          9.309220e+07  1.007281e+08     4.027925e+08  8.286669e+07

genres                  War       Western
release_year
1960s                   NaN           NaN
1970s                   NaN           NaN
1980s                   NaN           NaN
1990s                   NaN           NaN
2000s          1.353780e+07  9.682007e+07
2010s          2.268953e+08  4.903142e+08
```

[389]:
```
fig, ax = plt.subplots(figsize=(20,8))
pd.
 ↪pivot_table(df,index="release_year",columns="genres",values='revenue_adj',aggfunc=pd.
 ↪Series.mean).\
plot(kind='bar',ax=ax,width=-.9,align='edge', title = 'Geners revenue over the␣
  ↪years');
ax.set_ylabel('Revenue');
```



## Conclusions ## 1. Data Limitations Although our dataset contains more than 10,000 rows it's pretty insufficient to draw precise conclusions :

```
1. Most of the data columns are irrelevant for the analysis

2. many NAN values are missing from our dataset for an uncertain reason (We should try a bette
```

2.1 Conclusive Insights from our Analysis based on our cleaned data

1. Interest in movie genres varies overtime period.
2. revenue for each genres changes overtime period

```
[ ]:
```

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[ ]:
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[ ]:
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[ ]:
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