Investigate_a_Dataset

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1 Project: Investigate a Dataset - TDP Movies

1.1 Table of Contents

## Introduction

Dataset Description This data set contains information about 10,000 movies collected from The Movie Database (TMDb), including user ratings and revenue.

Certain columns, like 'cast' and 'genres', contain multiple values separated by pipe (|) characters. There are some odd characters in the 'cast' column. Don't worry about cleaning them. You can leave them as is. The final two columns ending with "_adj" show the budget and revenue of the associated movie in terms of 2010 dollars, accounting for inflation over time.

Columns: Imdb_id - - original_title cast - - popularity director - - production_companies release_year - - revenue budget_adj - - revenue_adj

1.1.1 Question(s) for Analysis

Which acrtor achieve revenue in their movies

who the director has top successfull movies

production companies revenue vs budget (loss or gain)

```
In [1]: # import statements for all of the packages

        import pandas as pd
        import numpy as np
        import matplotlib.pyplot as plt
        import seaborn as snb
        %matplotlib inline
```

```
In [2]: # 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: python-dateutil>=2.6.1 in /opt/conda/lib/python
Requirement already satisfied, skipping upgrade: numpy>=1.13.3 in /opt/conda/lib/python3.6/site-
Requirement already satisfied, skipping upgrade: pytz>=2017.2 in /opt/conda/lib/python3.6/site-p
Requirement already satisfied, skipping upgrade: six>=1.5 in /opt/conda/lib/python3.6/site-packa
```

## Data Wrangling

1.1.2 General Properties

```
In [3]: #load data from csv file and check the null values volume
        df= pd.read_csv('Database_TMDb_movie_data/tmdb-movies.csv')
        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 [4]: # Check the statistics for the data frame
        df.describe()
```

```
Out[4]:                  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
```

```
In [5]: # Check the number of columns and rows for the dataframe
        df.shape
```

```
Out[5]: (10866, 21)
```

```
In [6]: # Get the number of NA/Null values for each feature
        df.isnull().sum()
```

```
Out[6]: 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
```

1.1.3 Data Cleaning

Which data to be droped For the questions about cast and director, it will be necessary to drop the rows has NA values. Production_companies will droped in the question number 3.

which data to be filled There is no data can be filled.

NA data to be ignored The columns home page, tagline and keywords NA values will be ignored because it is not inculded in the calculations

```
In [7]: ''' Drop the cast and directors NA values from
        the dataframe to calculate the average revenue and top rated movies
        '''
        df.dropna(subset=['cast','director'], how='any',inplace=True)
```

```
In [8]: # Check features after drop the NA
        df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 10752 entries, 0 to 10865
Data columns (total 21 columns):
id                      10752 non-null int64
imdb_id                 10746 non-null object
popularity              10752 non-null float64
budget                  10752 non-null int64
revenue                 10752 non-null int64
original_title          10752 non-null object
cast                    10752 non-null object
homepage                2898 non-null object
director                10752 non-null object
tagline                 8007 non-null object
keywords                9312 non-null object
overview                10749 non-null object
runtime                 10752 non-null int64
genres                  10732 non-null object
production_companies    9780 non-null object
release_date            10752 non-null object
vote_count              10752 non-null int64
vote_average            10752 non-null float64
release_year            10752 non-null int64
budget_adj              10752 non-null float64
revenue_adj             10752 non-null float64
dtypes: float64(4), int64(6), object(11)
memory usage: 1.8+ MB
```

```
In [9]: df.isnull().sum()
```

```
Out[9]: id                         0
        imdb_id                    6
        popularity                 0
        budget                     0
        revenue                    0
        original_title             0
        cast                       0
        homepage                7854
        director                   0
        tagline                 2745
        keywords                1440
        overview                   3
        runtime                    0
        genres                    20
        production_companies     972
        release_date               0
        vote_count                 0
        vote_average               0
        release_year               0
        budget_adj                 0
        revenue_adj                0
        dtype: int64
```

```
In [10]: # Add column Main Actor/Actress by applying lamda function to split the cast cell by |
         df['MainActor']= df['cast'].apply(lambda x: x.split('|')[0])
         # another way to get the Main actor df['MainActor']=[ act.split('|')[0] for act in df['
```

```
In [11]: df.head()
```

```
Out[11]:        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  ... runtime  \
0              The park is open.  ...     124
1             What a Lovely Day.  ...     120
2        One Choice Can Destroy You  ...     119
3  Every generation has a story.  ...     136
4            Vengeance Hits Home  ...     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         MainActor
0          6.5          2015  1.379999e+08  1.392446e+09       Chris Pratt
1          7.1          2015  1.379999e+08  3.481613e+08         Tom Hardy
2          6.3          2015  1.012000e+08  2.716190e+08  Shailene Woodley
3          7.5          2015  1.839999e+08  1.902723e+09     Harrison Ford
4          7.3          2015  1.747999e+08  1.385749e+09        Vin Diesel

[5 rows x 22 columns]
```

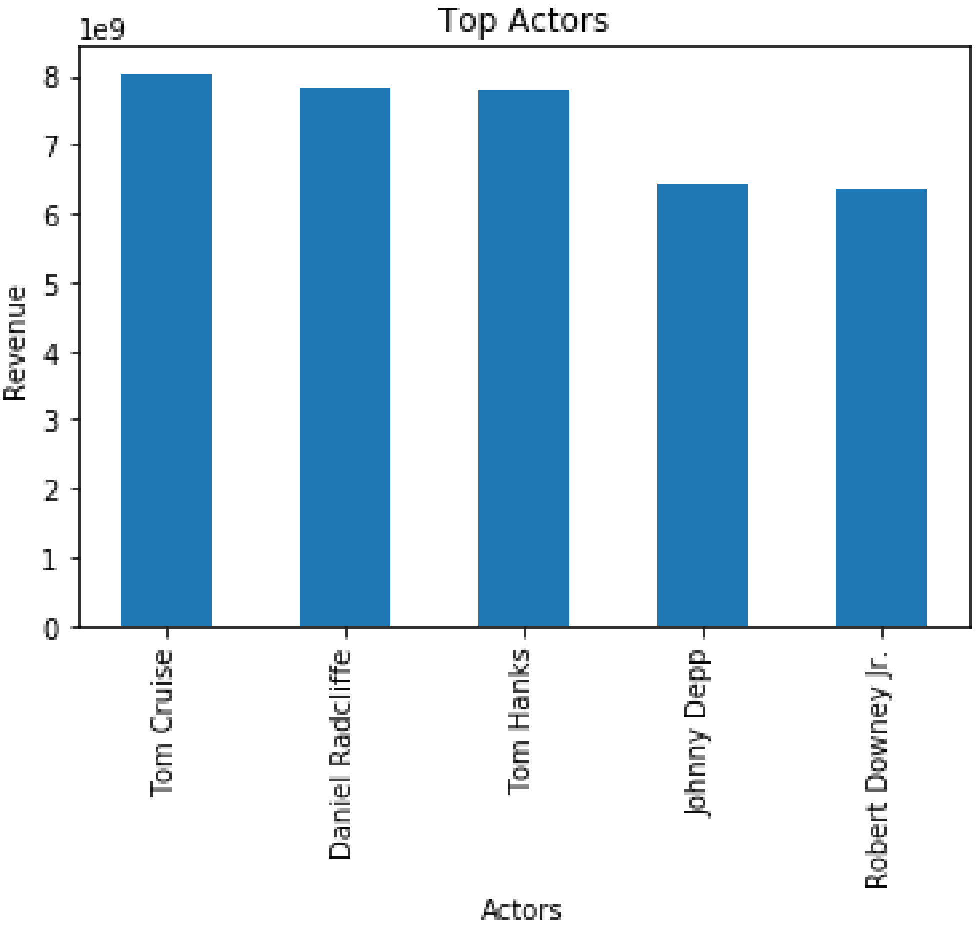
## Exploratory Data Analysis

1.1.4 Research Question 1 (top acrtors achieved revenue in their movies)

```
In [12]: #group by Main actor and sum the revenue per actor.
         top_actors = df.groupby('MainActor')['revenue'].sum().sort_values(ascending=False)

In [13]: top_actors =top_actors.head(5)
In [14]: top_actors.plot(kind='bar',title="Top Actors", label='Actor');
         plt.xlabel("Actors")
         plt.ylabel('Revenue')

Out[14]: Text(0,0.5,'Revenue')
```



```
In [ ]:
```

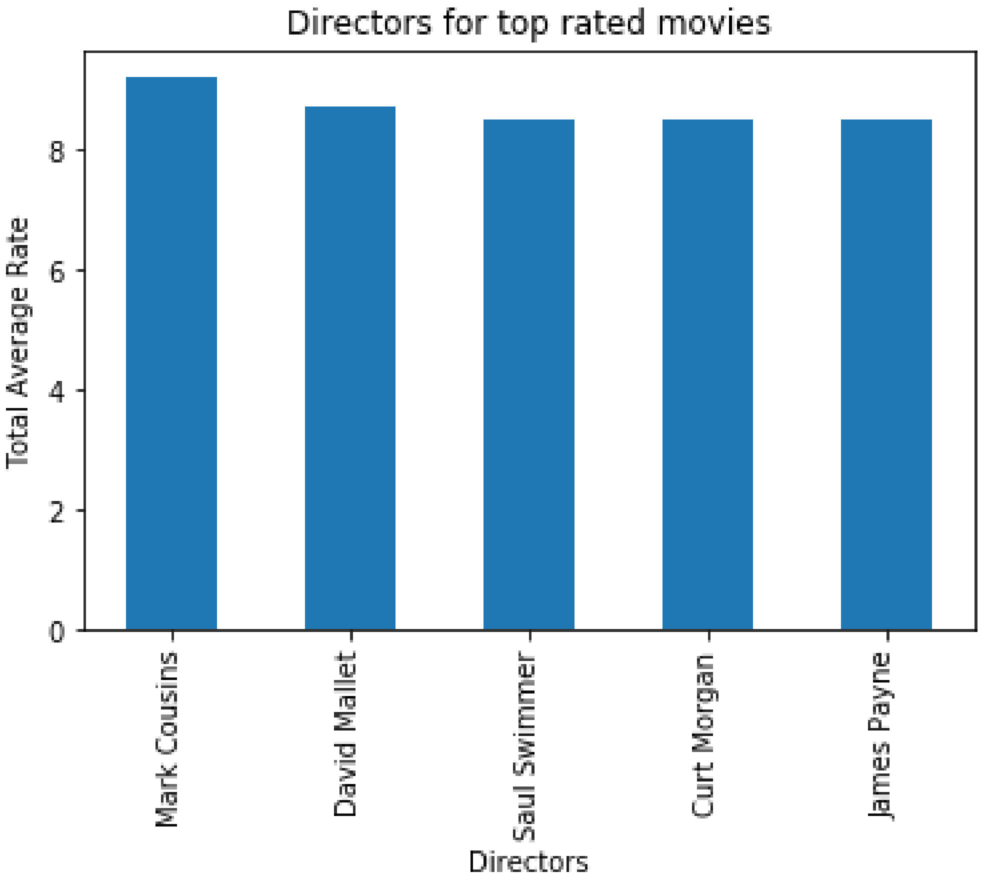
1.1.5 Research Question 2 (who the director has top rated movies)

```
In [15]: # group by directors to get the average of the vote average column for all movies direc

         top_five_directors=df.groupby('director')['vote_average'].mean().sort_values(ascending=

In [16]: top_five_directors.plot(kind='bar',title="Directors for top rated movies", label='Direc
         plt.xlabel("Directors")
         plt.ylabel('Total Average Rate')

Out[16]: Text(0,0.5,'Total Average Rate')
```

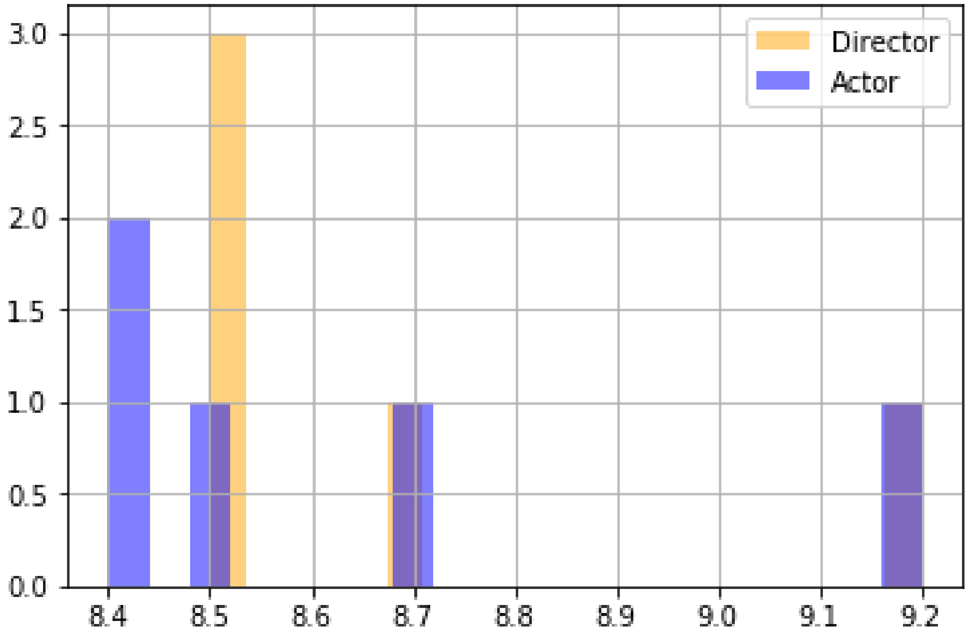


1.1.6 Extra Step

Comparing between the actors and directors for the top rated movies

```
In [17]: top_five_actors=df.groupby('MainActor')['vote_average'].mean().sort_values(ascending=Fa
```

```
In [18]: top_five_directors.hist(alpha=0.5, bins=20, color='orange' ,label='Director');
         top_five_actors.hist(alpha=0.5, bins=20, color='blue' ,label='Actor');
         plt.legend();
```

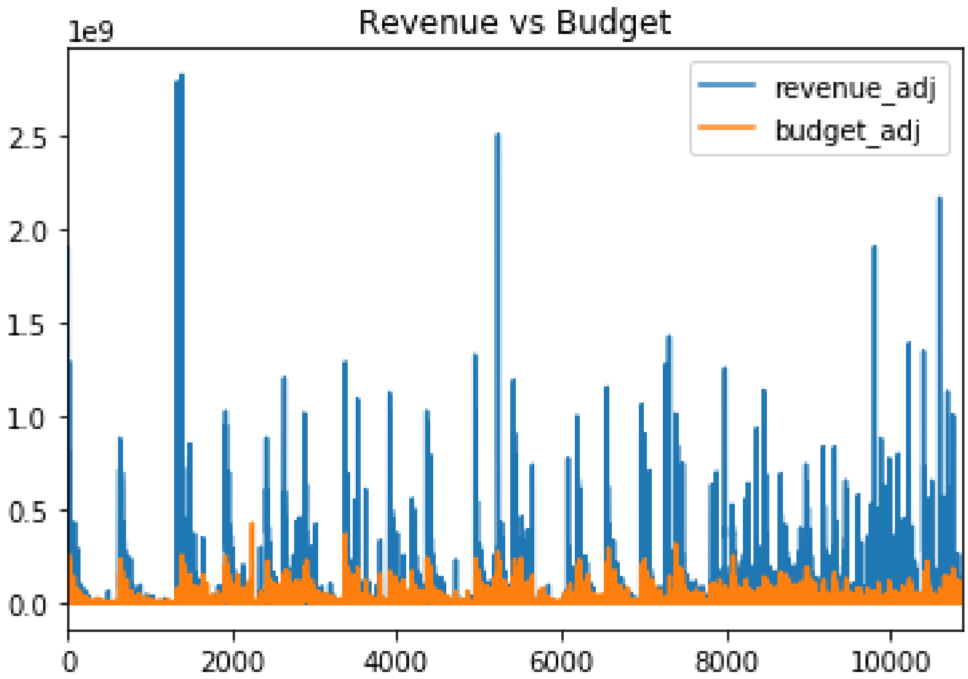


1.1.7 Question 3 (production companies revenue vs budget (loss or gain))

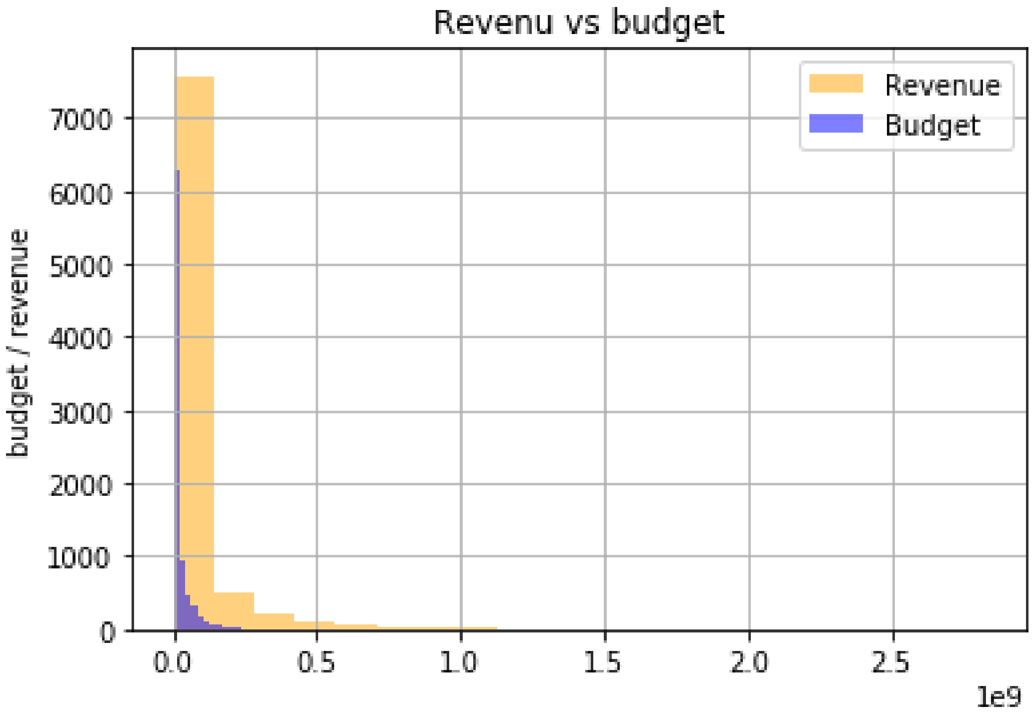
```
In [19]: def fillNAWithValue(df,colName,ValueToFill):
             '''
             This function to fill the Na values  in column
             with specific word
             args:
                 df : the dataframe
                 colName: the column name will be filled
                 ValueToFill: the value will be used to fill the NA
             '''
             df[colName].fillna(ValueToFill, inplace=True)
```

```
In [20]: #Fill NA with Other word
         fillNAWithValue(df,'production_companies','Other')
```

```
In [47]: companies_revenue = df.groupby('production_companies')[['production_companies','revenue
         companies_revenue.plot(title='Revenue vs Budget');
```

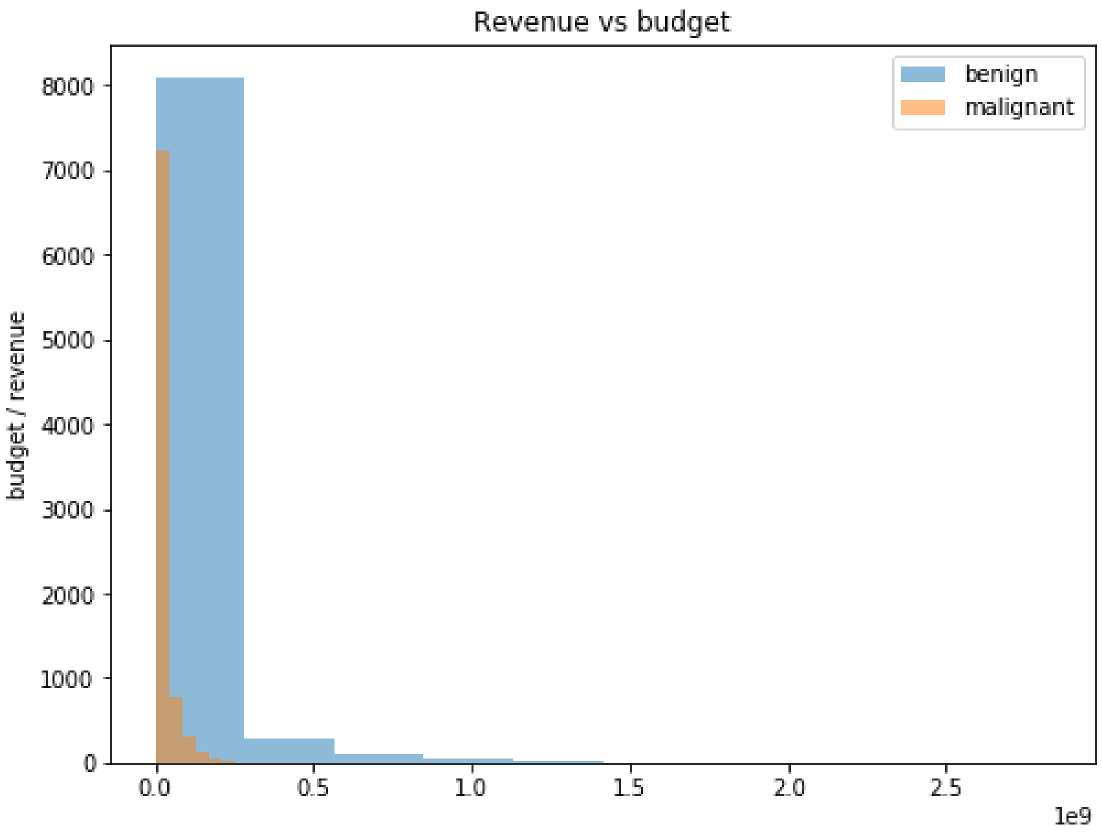


```
In [43]: companies_revenue['revenue_adj'].hist(alpha=0.5, bins=20, color='orange' ,label='Revenu
         companies_revenue['budget_adj'].hist(alpha=0.5, bins=20, color='blue' ,label='Budget');
         plt.title('Revenu vs budget');
         plt.ylabel('budget / revenue');
         plt.legend();
```



```
In [44]: fig, ax = plt.subplots(figsize =(8,6))
         ax.hist(companies_revenue['revenue_adj'], alpha=0.5, label='benign')
         ax.hist(companies_revenue['budget_adj'], alpha=0.5, label='malignant')
         ax.set_title('Revenue vs budget')

         ax.set_ylabel('budget / revenue')
         ax.legend(loc='upper right')
         plt.show();
```



```
In [ ]:
```

## Conclusions

Tip: Finally, summarize your findings and the results that have been performed in relation to the question(s) provided at the beginning of the analysis. Summarize the results accurately, and point out where additional research can be done or where additional information could be useful.

Tip: Make sure that you are clear with regards to the limitations of your exploration. You should have at least 1 limitation explained clearly.

Tip: If you haven't done any statistical tests, do not imply any statistical conclusions. And make sure you avoid implying causation from correlation!

Tip: Once you are satisfied with your work here, check over your report to make sure that it is satisfies all the areas of the rubric (found on the project submission page at the end of the lesson). You should also probably remove all of the "Tips" like this one so that the presentation is as polished as possible.

1.2 Submitting your Project

Tip: Before you submit your project, you need to create a .html or .pdf version of this notebook in the workspace here. To do that, run the code cell below. If it worked correctly, you should get a return code of 0, and you should see the generated .html file in the workspace directory (click on the orange Jupyter icon in the upper left).

Tip: Alternatively, you can download this report as .html via the **File** > **Download as** submenu, and then manually upload it into the workspace directory by clicking on the orange Jupyter icon in the upper left, then using the Upload button.

Tip: Once you've done this, you can submit your project by clicking on the "Submit Project" button in the lower right here. This will create and submit a zip file with this .ipynb doc and the .html or .pdf version you created. Congratulations!

```
In [48]: from subprocess import call
         call(['python', '-m', 'nbconvert', 'Investigate_a_Dataset.ipynb'])

Out[48]: 0

In [ ]:
```