investigate-a-dataset-template

April 28, 2018

> **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: Investigate a Dataset (Replace this with something more specific!)

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.

Dataset : TMDb movie data 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.

Question : Which genres are most popular from year to year? What kinds of properties are associated with movies that have high revenues?

```
In [1]: # Use this cell to set up import statements for all of the packages that you
        #   plan to use.

        import numpy as np
        import pandas as pd
        import seaborn as sn
        import matplotlib.pyplot as plt
        from pprint import pprint

        # 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
```

## 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.

1.1.1 General Properties

```
In [2]: # Load your data and print out a few lines. Perform operations to inspect data()
        data = pd.read_csv('data/tmdb-movies.csv')
        data.iloc[0]
        #   types and look for instances of missing or possibly errant data.
```

```
Out[2]: id                                                                 135397
        imdb_id                                                         tt0369610
        popularity                                                        32.9858
        budget                                                          150000000
        revenue                                                        1513528810
        original_title                                             Jurassic World
        cast                    Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...
        homepage                                    http://www.jurassicworld.com/
        director                                                  Colin Trevorrow
        tagline                                                 The park is open.
        keywords                monster|dna|tyrannosaurus rex|velociraptor|island
        overview                Twenty-two years after the events of Jurassic ...
        runtime                                                               124
        genres                          Action|Adventure|Science Fiction|Thriller
        production_companies    Universal Studios|Amblin Entertainment|Legenda...
        release_date                                                      6/9/15
        vote_count                                                           5562
        vote_average                                                          6.5
        release_year                                                         2015
        budget_adj                                                       1.38e+08
        revenue_adj                                                   1.39245e+09
        Name: 0, dtype: object
```

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).

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

```
In [3]: # 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.
        data.drop_duplicates(keep = 'first', inplace = True)
        len(data)
        df_new = data.dropna(axis=1,how='all')
        len(df_new)
```

```
Out[3]: 10865
```

## 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.

1.1.3 Research Question 1 (Replace this header name!)

```
In [4]: data.iloc[0].genres.split('|', 1)

        dfNew2 = df_new[~df_new['genres'].isnull()]
        genr_year = []


        for index, row in dfNew2.iterrows():
            release_year = row['release_year']
            genr = row['genres']
            genr_split = row['genres'].split('|')
            for val in genr_split:
                m = (val, release_year)
                genr_year.append(m)
```

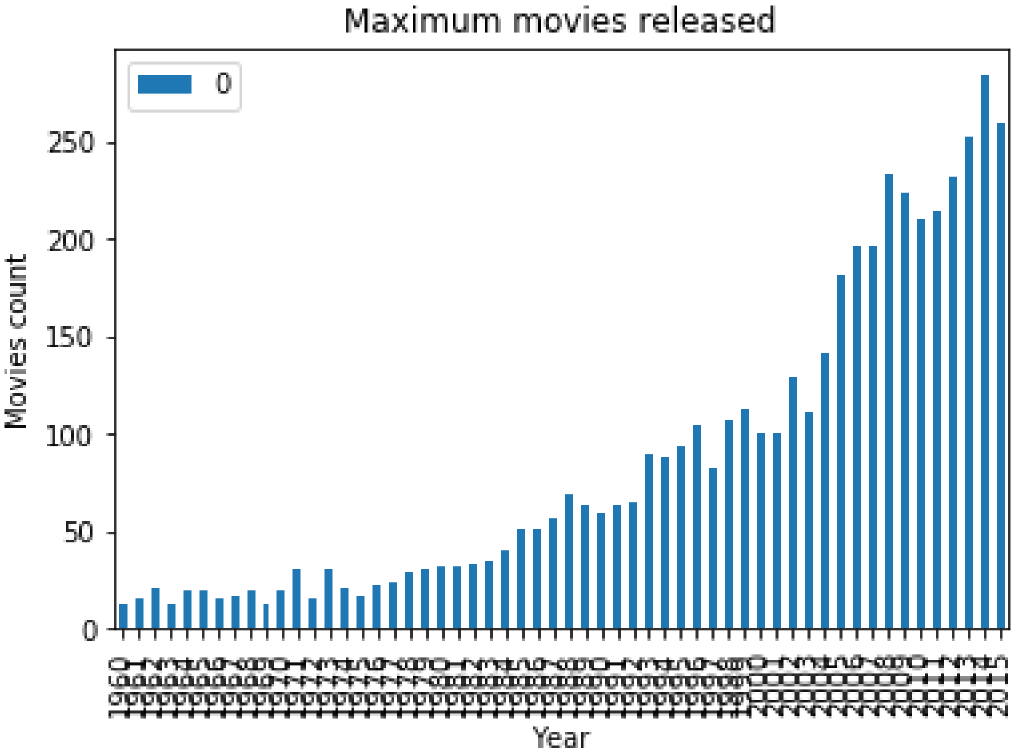
```
genres_year_df = pd.DataFrame(genr_year, columns=['genres','year'])
grouped_genrus_year = genres_year_df.groupby(['year','genres']).size().reset_index().gro
grouped_genrus_year
```

```
Out[4]:        genres    0
        year
        1960  Western   13
        1961  Western   16
        1962  Western   21
        1963  Western   13
        1964  Western   20
        1965  Western   20
        1966  Western   16
        1967  Western   17
        1968  Western   20
        1969  Western   13
        1970  Western   19
        1971  Western   30
        1972  Western   16
        1973  Western   31
        1974  Western   21
        1975  Western   17
        1976  Western   22
        1977  Western   24
        1978  Western   29
        1979  Western   30
        1980  Western   32
        1981      War   32
        1982  Western   33
        1983  Western   35
        1984      War   40
        1985  Western   51
        1986  Western   51
        1987  Western   57
        1988      War   69
        1989  Western   63
        1990  Western   60
        1991  Western   63
        1992  Western   65
        1993  Western   90
        1994  Western   88
        1995  Western   93
        1996      War  104
        1997      War   83
        1998  Western  108
        1999  Western  113
        2000  Western  101
        2001  Western  101
```

```
2002  Western  130
2003  Western  111
2004  Western  141
2005  Western  182
2006  Western  197
2007  Western  197
2008  Western  233
2009      War  224
2010  Western  210
2011  Western  214
2012  Western  232
2013  Western  253
2014  Western  284
2015  Western  260
```

```
In [5]: grouped_genrus_year.plot(kind='bar')

        plt.ylabel("Movies count")
        plt.xlabel("Year")
        plt.title("Maximum movies released")
```

```
Out[5]: Text(0.5,1,'Maximum movies released')
```



1.1.4 Research Question 2 (Replace this header name!)

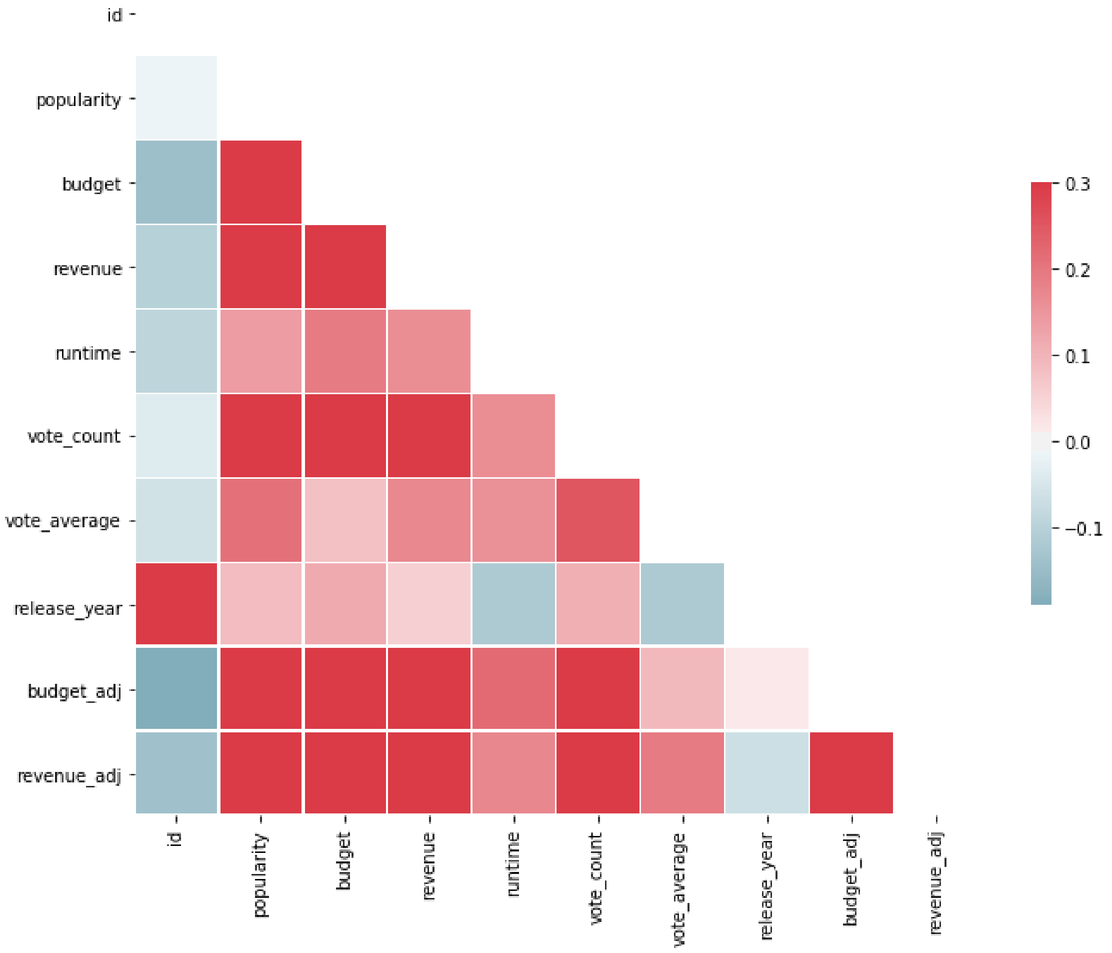
```
In [6]: # Continue to explore the data to address your additional research
        #   questions. Add more headers as needed if you have more questions to
        #   investigate.
        # What kinds of properties are associated with movies that have high revenues?
        data.corr()
```

```
Out[6]:                    id  popularity    budget   revenue   runtime  vote_count  \
        id            1.000000   -0.014351 -0.141341 -0.099235 -0.088368   -0.035555
        popularity   -0.014351    1.000000  0.545481  0.663360  0.139032    0.800828
        budget       -0.141341    0.545481  1.000000  0.734928  0.191300    0.632719
        revenue      -0.099235    0.663360  0.734928  1.000000  0.162830    0.791174
        runtime      -0.088368    0.139032  0.191300  0.162830  1.000000    0.163273
        vote_count   -0.035555    0.800828  0.632719  0.791174  0.163273    1.000000
        vote_average -0.058391    0.209517  0.081067  0.172541  0.156813    0.253818
        release_year  0.511393    0.089806  0.115904  0.057070 -0.117187    0.107962
        budget_adj   -0.189008    0.513555  0.968963  0.706446  0.221127    0.587062
        revenue_adj  -0.138487    0.609085  0.622531  0.919109  0.175668    0.707941

                      vote_average  release_year  budget_adj  revenue_adj
        id               -0.058391      0.511393   -0.189008    -0.138487
        popularity        0.209517      0.089806    0.513555     0.609085
        budget            0.081067      0.115904    0.968963     0.622531
        revenue           0.172541      0.057070    0.706446     0.919109
        runtime           0.156813     -0.117187    0.221127     0.175668
        vote_count        0.253818      0.107962    0.587062     0.707941
        vote_average      1.000000     -0.117576    0.093079     0.193062
        release_year     -0.117576      1.000000    0.016771    -0.066236
        budget_adj        0.093079      0.016771    1.000000     0.646627
        revenue_adj       0.193062     -0.066236    0.646627     1.000000
```

As per the table above, revenue is more corrlated with vote_count with the correlation value of 0.79

```
In [7]: # Compute the correlation matrix
        corr = data.corr()

        mask = np.zeros_like(corr, dtype=np.bool)
        mask[np.triu_indices_from(mask)] = True

        f, ax = plt.subplots(figsize=(11, 9))

        cmap = sn.diverging_palette(220, 10, as_cmap=True)

        sn.heatmap(corr, mask=mask, cmap=cmap, vmax=.3, center=0,
                  square=True, linewidths=.5, cbar_kws={"shrink": .5})
```

```
Out[7]: <matplotlib.axes._subplots.AxesSubplot at 0x7f1c4e1dc2e8>
```



## Conclusions

> **Tip**: Finally, summarize your findings and the results that have been performed. Make sure that you are clear with regards to the limitations of your exploration. 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, you should save a copy of the report in HTML or PDF form via the **File** > **Download as** submenu. Before exporting your report, check over it to make sure that the flow of the report is complete. You should probably remove all of the "Tip" quotes like this one so that the presentation is as tidy as possible. Congratulations!

As per the data of movies, High revenu is associated with the following in the order it was associated. 1. Vote_count (having correlation value of 79%). If the vote_count is high then obvious more people come and see the movie which in turns increase the revenue) 2. Budget (having correlation value of 73%. Higher the budget is , higher the revenue of movie as per the dataset) 3. Popularity (having correlation value of 66.3%. Higher the popularity of movie is , higher the revenue of movie as per the dataset)