Investigate_a_Dataset

November 18, 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 (MoviesDatabase)

1.1 Table of Contents

> **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're not sure what questions to ask, then make sure you familiarize yourself with the dataset, its variables and the dataset context for ideas of what to explore.
>
> If you haven't yet selected and downloaded your data, make sure you do that first before coming back here. In order to work with the data in this workspace, you also need to upload it to the workspace. To do so, click on the jupyter icon in the upper left to be taken back to the workspace directory. There should be an 'Upload' button in the upper right that will let you add your data file(s) to the workspace. You can then click on the .ipynb file name to come back here.

```
In [96]: # 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 pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

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 [97]:
```
# Load your data and print out a few lines. Perform operations to inspect data
#   types and look for instances of missing or possibly errant data.
df = pd.read_csv('tmdb-movies.csv')
df.head()
```

Out[97]:

	id	imdb_id	popularity	budget	revenue	original_title	cast	homepage	director	tagline	...
0	135397	tt0369610	32.985763	150000000	1513528810	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	http://www.jurassicworld.com/	Colin Trevorrow	The park is open.	...
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	What a Lovely Day.	...
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		

```
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]
```

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 (Remove Nulls and duplicates!)

In [83]:
```
# 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.

#Removing nulls and duplicates from data set
#before cleaning
df.info()
df['imdb_id'].fillna('', inplace = True)
df['homepage'].fillna('', inplace = True)
df['cast'].fillna('', inplace = True)
df['tagline'].fillna('', inplace = True)
df['director'].fillna('', inplace = True)
df['keywords'].fillna('', inplace = True)
df['overview'].fillna('', inplace = True)
df['genres'].fillna('', inplace = True)
df['production_companies'].fillna('', inplace = True)
df.drop_duplicates(inplace = True)
#after cleaning
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
<class 'pandas.core.frame.DataFrame'>
Int64Index: 10865 entries, 0 to 10865
```

```
Data columns (total 21 columns):
id                      10865 non-null int64
imdb_id                 10865 non-null object
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
homepage                10865 non-null object
director                10865 non-null object
tagline                 10865 non-null object
keywords                10865 non-null object
overview                10865 non-null object
runtime                 10865 non-null int64
genres                  10865 non-null object
production_companies    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(11)
memory usage: 1.8+ MB
```

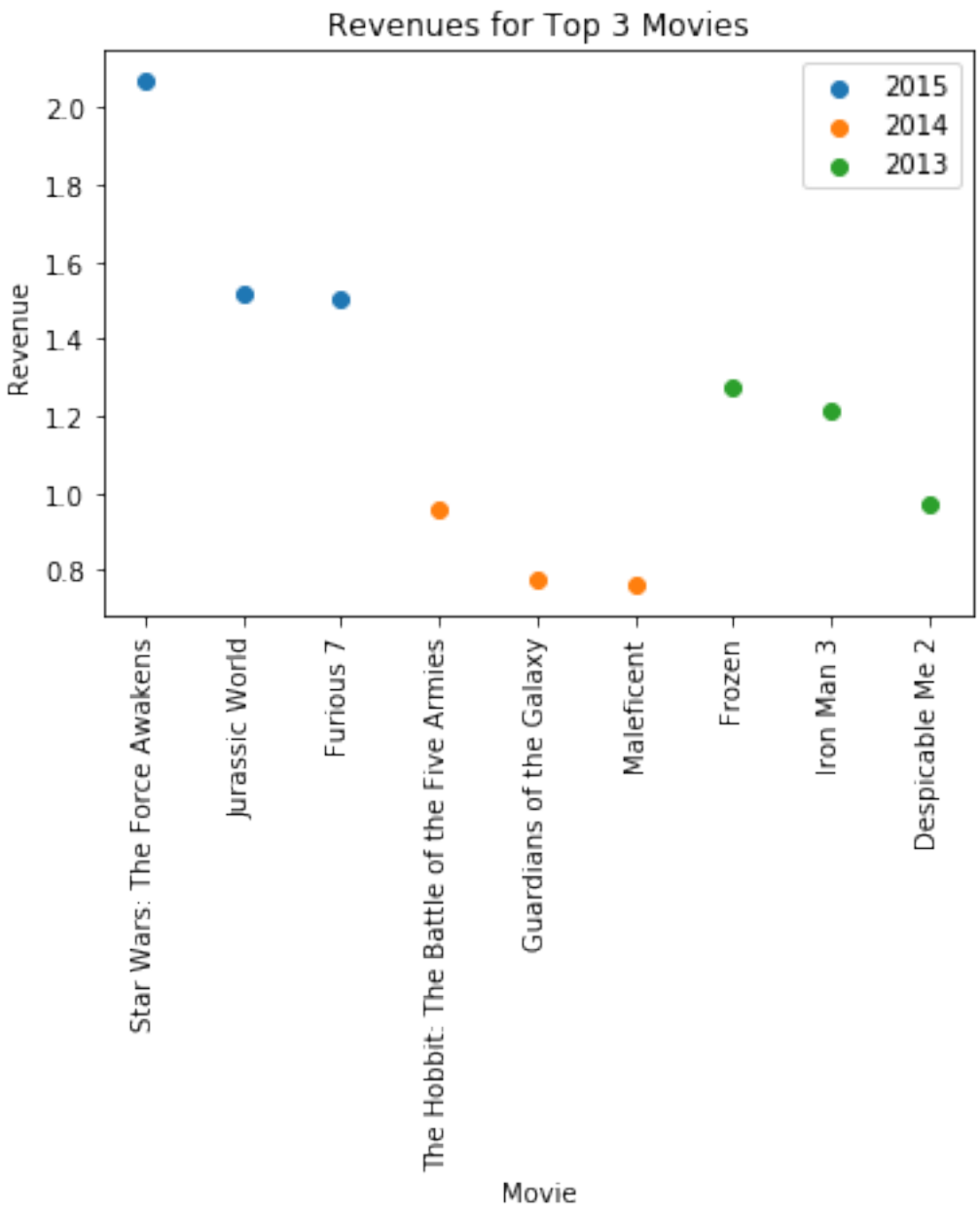
Exploratory Data Analysis

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 (Which top 3 movies have the high revenues for last 3 years?!)

In [99]:
```
# Use this, and more code cells, to explore your data. Don't forget to add
#   Markdown cells to document your observations and findings.

#get the last 3 years inseperate variables
year_2013 = df[df['release_year'] == 2013]
year_2014 = df[df['release_year'] == 2014]
year_2015 = df[df['release_year'] == 2015]

#get the 3 highest revenues for each year
highest3_2015 = year_2015.nlargest(3,'revenue')
x_2015 = np.array(highest3_2015['original_title'])
y_2015 = np.array(highest3_2015['revenue']/(10**9))
```

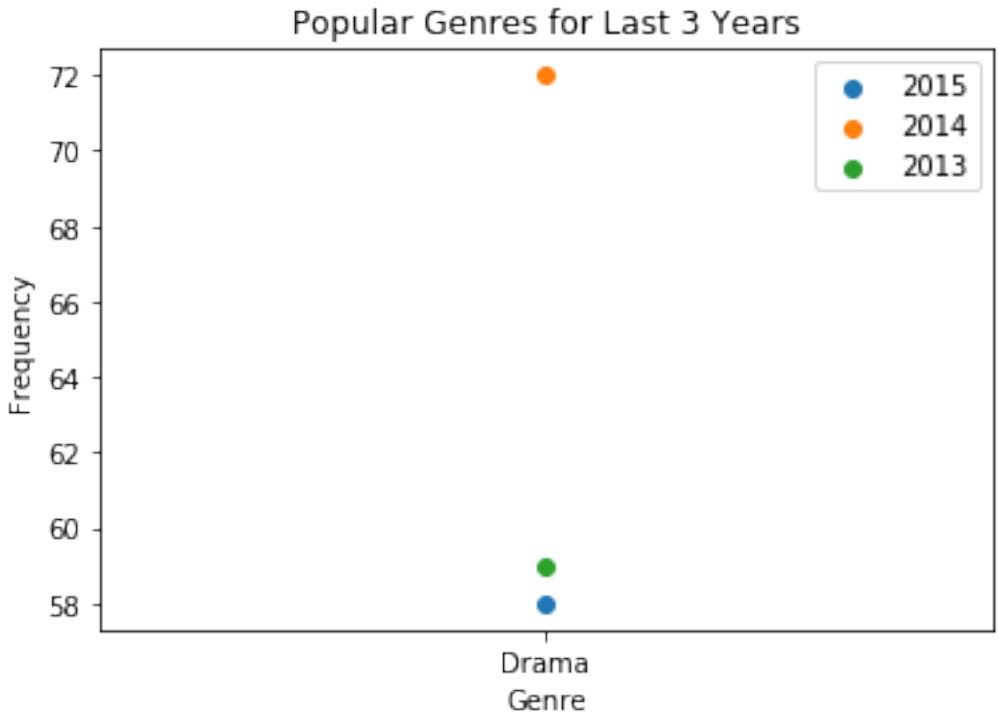
```
highest3_2014 = year_2014.nlargest(3,'revenue')
x_2014 = np.array(highest3_2014['original_title'])
y_2014 = np.array(highest3_2014['revenue']/(10**9))

highest3_2013 = year_2013.nlargest(3,'revenue')
x_2013 = np.array(highest3_2013['original_title'])
y_2013 = np.array(highest3_2013['revenue']/(10**9))

#plot the data
x = [1, 2, 3, 4, 5, 6, 7, 8, 9]
l = np.concatenate((x_2015, x_2014, x_2013))

plt.scatter(x[:3], y_2015, label = '2015')
plt.scatter(x[3:6], y_2014, label = '2014')
plt.scatter(x[6:], y_2013, label = '2013')

plt.xticks(x, l, rotation='vertical')

plt.title('Revenues for Top 3 Movies')
plt.xlabel('Movie')
plt.ylabel('Revenue')
plt.legend()

plt.show()
```



1.1.4 Research Question 2 (Which genres are most popular fro last 3 years?!)

```
In [100]: # Continue to explore the data to address your additional research
          #   questions. Add more headers as needed if you have more questions to
          #   investigate.

          #get the maximum genre count for each year
          y_2015 = year_2015.groupby('genres').count().max()['id']
          x_2015 = year_2015.groupby('genres').count().idxmax()['id']
```

```
y_2014 = year_2014.groupby('genres').count().max()['id']
x_2014 = year_2014.groupby('genres').count().idxmax()['id']

y_2013 = year_2013.groupby('genres').count().max()['id']
x_2013 = year_2013.groupby('genres').count().idxmax()['id']

#plot the data
plt.scatter(x_2015, y_2015, label = '2015')
plt.scatter(x_2014, y_2014, label = '2014')
plt.scatter(x_2013, y_2013, label = '2013')

plt.title('Popular Genres for Last 3 Years')
plt.xlabel('Genre')
plt.ylabel('Frequency')
plt.legend()

plt.show()
```



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 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

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).

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.

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