Cross-genre *versus* Mono-genre movies

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Dataset(s)

IMDB Movie Dataset (Movielens Dataset)

Motivation

Our main objective is to isolate a factor that could help the movie industry to improve their movies' audience and by consequence their profitability.

We will focus exactly on the impact of movie genre on the amount of audience.

And more precisely, we will be interested in the difference between cross-genre movies (movies with more than one genre) and mono-genre movies (movies with exactly one genre) in terms of ratings attraction.

For the rest of the analysis, we will make the assumption that the number of the ratings that a movie receives is a good enough indicator of the amount of audience that a movie can attract.

Research Questions

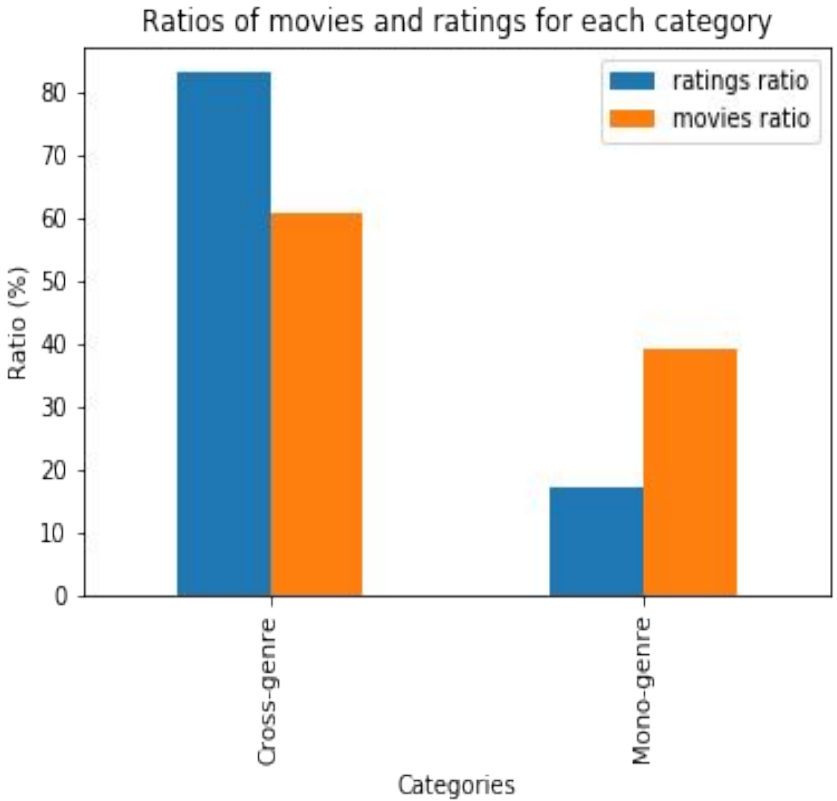
- Do cross-genre movies attract more or less ratings (audience) than the mono-genre movies ?

- How movies are distributed across the two categories of genre (cross-genre, mono-genre)?

Findings

After grouping movies and ratings by category of genre, and presenting the numbers as ratios, we can make two important observations :

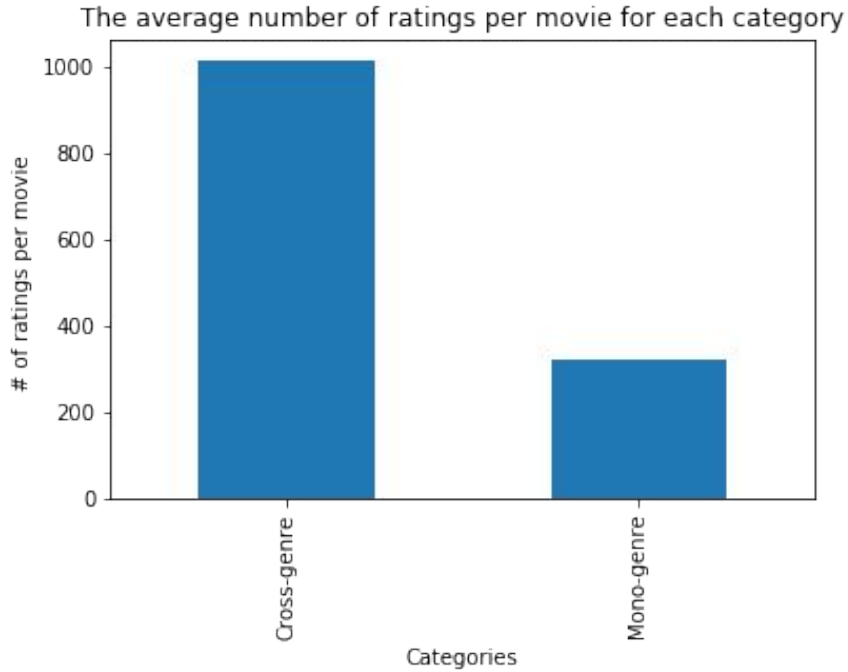
1. In terms of movie production, the cross-genre movies represent 60% of the total movies produced, and the remaining 40% are mono-genre movies.
2. We also notice that more than 83% of the total ratings given by users are directed towards cross-genre movies, while less than 17% of the ratings are given for the mono-genre movies.



Findings

By computing the average number of ratings (regardless of the value of the rating) per movie for each category, we can make the following observation :

> In average, a cross-genre movie receives three times more ratings (≈1011 rating per movie) than what a mono-genre movie receives (≈ 319 rating per movie)



Conclusions

Fast shortcut : cross-genre movies attract more audience (as we assumed that more ratings means more audience), and thus, are more profitable.

But, It goes without saying, that we still need to dive deeper into the data to confirm or to refute these findings and to draw more precise conclusions by doing a fine grained analysis that takes into account the different combinations of genres.

Acknowledgements

I had no one to give me feedback

References

- Course material : UCSanDiegoX - DSE200x (chapter 01 to chapter 05)
- Python documentation : https://docs.python.org/3/reference/index.html
- Pandas documentation : https://pandas.pydata.org/pandas-docs/version/0.21/index.html
- Matplotlib documentation : https://matplotlib.org/3.1.1/contents.html

Cross-genre Movies *Versus* Mono-genre Movies

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UCSanDiegoX : DSE200x
Mini-project Submission

Table of content :

1. Abstract

In this study, we are interested in analyzing the movielens data.

Our main objective is to understand whether the cross-genre movies (movies with more than one genre) attract more or less audience than the mono-genre movies

By the end of this analysis, the questions below will be discussed :

1. What is the global distribution of movie production regarding to their category (cross-genre or mono-genre)?
2. What is the distribution of the **number** of ratings regarding to the movie's category (cross-genre or mono-genre)?
3. Under the light of the answers on the former questions, what advice we can give to the movie production industry in order to improve the audience of their future movies?

Assumption :

Across this analysis, we will make the assumption that the number of ratings that a category gets, correlates positively with the number of audience that this category attracts, i.e, if a category (A) has 90% of the ratings and if the category (B) has only 10% of the ratings, then, we consider that the category (A) attracts more audience than the category (B)

2. Data loading

In [1]:
```
%matplotlib inline

import pandas as pd
import numpy as np
import random
import matplotlib.pyplot as plt
import time
```

In [2]:
```
movies = pd.read_csv('movielens/movies.csv')
movies.head(5)
```

Out[2]:

	movieId	title	genres
0	1	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy
1	2	Jumanji (1995)	Adventure|Children|Fantasy
2	3	Grumpier Old Men (1995)	Comedy|Romance
3	4	Waiting to Exhale (1995)	Comedy|Drama|Romance
4	5	Father of the Bride Part II (1995)	Comedy

In [3]:
```
ratings = pd.read_csv('movielens/ratings.csv')
ratings.head(5)
```

Out[3]:

	userId	movieId	rating	timestamp
0	1	2	3.5	1112486027
1	1	29	3.5	1112484676
2	1	32	3.5	1112484819
3	1	47	3.5	1112484727
4	1	50	3.5	1112484580

3. Data preparation

Movies data

In [4]:
```
# Some movies are not associated with any genre:
print(movies[movies.genres == '(no genres listed)'].shape)

# We remove them :
movies = movies[movies.genres != '(no genres listed)']

print(movies[movies.genres == '(no genres listed)'].shape)
```

```
(246, 3)
(0, 3)
```

In [5]:
```
# We add a column that counts the number of genre for each movie  :
movies['genres_count'] = movies.genres.str.split('|').apply(lambda x : len(x))
movies.head(5)
```

Out[5]:

	movieId	title	genres	genres_count
0	1	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy	5
1	2	Jumanji (1995)	Adventure|Children|Fantasy	3
2	3	Grumpier Old Men (1995)	Comedy|Romance	2
3	4	Waiting to Exhale (1995)	Comedy|Drama|Romance	3
4	5	Father of the Bride Part II (1995)	Comedy	1

In [6]:
```
# We add a column that contains the category of the movie : 'cross' or 'mono'
movies['category'] = movies.genres_count.apply(lambda x : 'mono' if x == 1 else 'cross')
movies.head(5)
```

Out[6]:

	movieId	title	genres	genres_count	category
0	1	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy	5	cross
1	2	Jumanji (1995)	Adventure|Children|Fantasy	3	cross
2	3	Grumpier Old Men (1995)	Comedy|Romance	2	cross
3	4	Waiting to Exhale (1995)	Comedy|Drama|Romance	3	cross
4	5	Father of the Bride Part II (1995)	Comedy	1	mono

Ratings data

In [7]:
```
# Droping superfluous columns
del ratings['userId']
del ratings['timestamp']

ratings.head(5)
```

Out[7]:

	movieId	rating
0	2	3.5
1	29	3.5
2	32	3.5
3	47	3.5
4	50	3.5

In [8]:
```
# Enriching the ratings dataset by adding genres from the movies dataset :
ratings = ratings.merge(movies, on='movieId')

# Droping unused columns
del ratings['title']

ratings.head(5)
```

Out[8]:

	movieId	rating	genres	genres_count	category
0	2	3.5	Adventure|Children|Fantasy	3	cross
1	2	3.0	Adventure|Children|Fantasy	3	cross
2	2	3.0	Adventure|Children|Fantasy	3	cross
3	2	3.0	Adventure|Children|Fantasy	3	cross
4	2	3.0	Adventure|Children|Fantasy	3	cross

4. Data Analysis

Let's first take a look at the distribution of the movies across the two categories :

In [9]:
```
# Lets group the movies dataset by category and show the ratio of movies for each cat
egory :
movies_total_count = movies.movieId.count()
movies_by_category = movies.groupby(['category']).movieId.agg(['count'])
movies_by_category['ratio'] = movies_by_category['count'] * 100 / movies_total_count
movies_by_category.columns = ['movies_count', 'movies_ratio']

movies_by_category
```

Out[9]:

category	movies_count	movies_ratio
cross	16449	60.850104
mono	10583	39.149896

Now, let's take a look at the ratings ratios, to see if they are compatible with the movies ratios : ¶

N.B: We do not take into account the value of the rating, we are just interested in counting the number of ratings, as we made the assumption in the begining that a big number of ratings is an indicator that the movie is popular and have a big audience.

In [10]:
```
# We group the ratings by category and compute a ratio for each category :
ratings_total_count = ratings.movieId.count()
ratings_by_category = ratings.groupby(['category']).rating.agg(['count'])
ratings_by_category['ratio'] = ratings_by_category['count'] * 100 / ratings_total_cou
nt
ratings_by_category.columns = ['ratings_count', 'ratings_ratio']

ratings_by_category
```

Out[10]:

category	ratings_count	ratings_ratio
cross	16622168	83.111247
mono	3377734	16.888753

Let's merge the data and compare :

In [14]:
```
# Merging the two results
data_by_category = ratings_by_category.merge(movies_by_category, on='category')

# Calculating a new column that contains the average number of rating received for ea
ch category :
data_by_category['ratings_per_movie'] = data_by_category['ratings_count']/data_by_cat
egory['movies_count']

data_by_category
```

Out[14]:

category	ratings_count	ratings_ratio	movies_count	movies_ratio	ratings_per_movie
cross	16622168	83.111247	16449	60.850104	1010.527570
mono	3377734	16.888753	10583	39.149896	319.166021

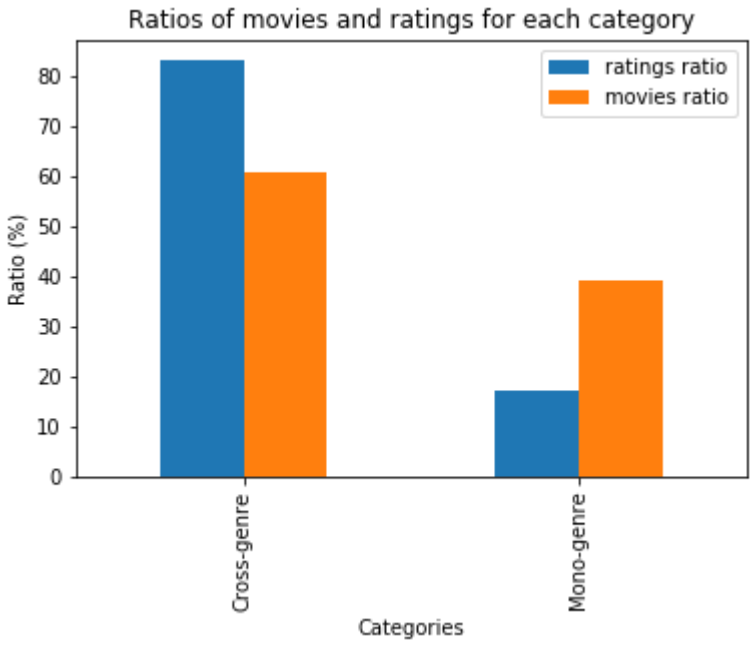
Observations :

1. We notice that in terms of movie production, the cross-genre movies represent 60% of the total movies produced, and the remaining 40% are mono-genre movies.
2. We also notice that more than 83% of the total ratings given by users are directed towards cross-genre movies, while less than 17% of the ratings are given for the mono-genre movies.
3. In average, a cross-genre movie receives three times more ratings (≈1011 rating per movie) than what a mono-genre movie receives (≈ 319 rating per movie)

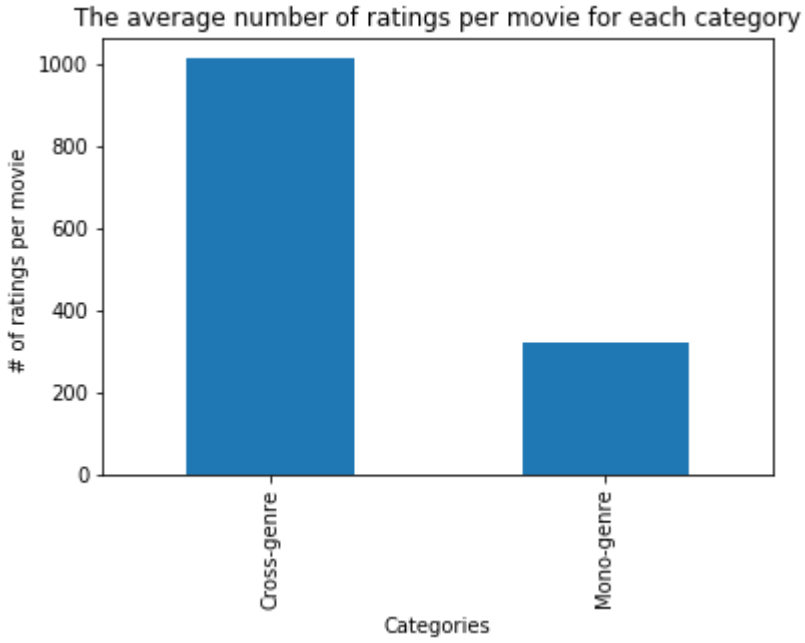
In [98]:
```
# Plotting the ratios
data_by_category.columns = ['# ratings', 'ratings ratio', '# movies', 'movies ratio',
'# of ratings per Movie']
data_by_category.index= ['Cross-genre', 'Mono-genre']

ax1 = data_by_category.iloc[:,[1,3]].plot.bar(title='Ratios of movies and ratings for
each category')
ax1.set_xlabel('Categories')
ax1.set_ylabel('Ratio (%)')
ax1.tick_params(axis='y')

plt.show()
```



In [97]:
```
# Plotting the average number of ratings per movie
ax1 = data_by_category.iloc[:,[4]].plot.bar(legend=False, title='The average number o
f ratings per movie for each category')
ax1.set_xlabel('Categories')
ax1.set_ylabel('# of ratings per movie ')
ax1.tick_params(axis='y')
```



5. Conclusions

- Cross-genre movies attract more audience (see the assumption above), and thus, are more profitable.
- The movie production industry produces more cross-genre movies than the mono-genre movies, but this production is still not balanced enough to represent the expectations of the audience.
- We still need to dive deeper into the data to confirm or to infirm these findings and to draw more precise conclusions on which combination of genres could be more interesting to the audience and more profitable.

In [ ]: