MUSIC RECOMMENDATION SYSTEM

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INTRODUCTION

Overview

A recommendation system is a program/system that tries to make a prediction based on users' past behavior and preferences. Recommendation systems are typically seen in applications such as music listening, watching movies and e-commerce applications where users' behavior can be modeled based on the history of purchases or consumption. We see them all around and it benefits a user in many ways because of its nature of prediction, value-add, and ease of consumption. A user wouldn't have to spend hours to decide about a particular movie or music or a product. The relevant and useful content gets delivered to the user at appropriate times. Our aim is to build such a recommendation system using the existing tools and technologies.

Context

We see an explosion of Music streaming apps these days and sometimes wonder or wrack our brains as to which one serves our purpose and how do we get the relevant set of songs when we open the application. We have many songs recommendation systems out there and those are being used by popular companies like Spotify, Jiosavaan, Gaana, Amazon Music, etc. And most of them do predict music or movies based on our previous watching/listening history and feedback. Most of them work based on Collaborative and Content-based filtering which they call the "Hybrid" model.Our work is based on Collaborative filtering where the songs will be recommended to users on the basis of their past behavior as well as similar decision made by other users.

Collaborative Filtering

- For this approach we have read ratings (user id, item id, rating, timestamp) and song (id, title) files as data frame and merge them.
- We scaled the weight column imported from the ratings file.
- We formed the compressed sparse row matrix with user id as our rows and item id as our columns and each entry in matrix contain weight(renamed to play count) which is the number of times each user plays songs corresponding to item id.
- Splitting the data in test and train
- Putting the data into the graphs.
- Finally predicting the ratings in our test set.

Tasks Involved

1. Literature Survey
2. Dataset collection
3. Data cleaning and pre-processing
4. Data visualization
5. Algorithm selection
6. Designing Recommender Architecture
7. Quantitative analysis of the results

Outcome Of Project

- Implementation of collaborative filtering.
- The complexity and challenges of pre-processing huge datasets and modeling the data suitably.
- During our literature survey, we learned different approaches to implement recommender systems.
- This project gave us a clear understanding of how to select datasets, what to look for in them and manipulate them to derive usable insights.

PROJECT METHODOLOGY

As mentioned above we have used collaborative-filtering approach to make this project. we have used 3 libraries and 2 datasets to make this project.

Libraries used are:

1) Pandas: - used this library to process data.

2) Matplotlib: - used this library to plot the data and make some conclusions from that.

3) Seaborn: - used this library for data visualization, so that it gives an attractive and informative statistical graphics.

Datasets used are:

1) ratings.csv:- In this csv file, the data of music ratings and number of users played particular song is stored.
2) Song.csv:- In this csv file, the music directory is stored.

STEPS IMPLEMENTED

1) We first read the rating from rating.csv file.

	user_id	item_id	rating	timestamp
0	0	50	5	881250949
1	0	172	5	881250949
2	0	133	1	881250949
3	196	242	3	881250949
4	186	302	3	891717742

2) We then read the music directory from the song.csv file.

	item_id	title
0	1	Stranger in Paradise
1	2	Break My Stride
2	3	Into The Nightlife
3	4	It's About Time
4	5	Popular Modern Themes

3) We will now merge both the csv file.

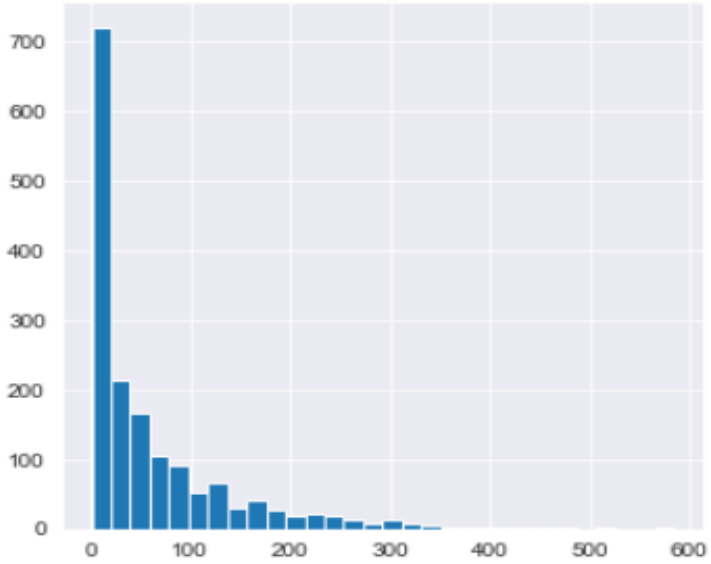
	user_id	item_id	rating	timestamp	title
0	0	50	5	881250949	Sunset Road
1	290	50	5	880473582	Sunset Road
2	79	50	4	891271545	Sunset Road
3	2	50	5	888552084	Sunset Road
4	8	50	5	879362124	Sunset Road

4) After that we'll do data visualization i.e. we'll count the ratings and will find its mean.

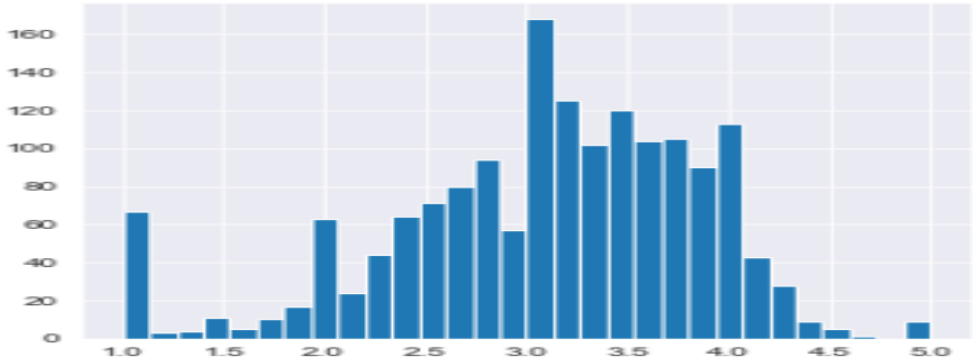
```
title
Sunset Road                584
Shake And Fingerpop        509
Killa Soundboy             508
Into Eternity              507
Let Her Dance              485
Name: rating, dtype: int64
```

```
title
Stay Tuned                   5.0
Tryin' to Get to Heaven      5.0
I Wanna Hold You             5.0
I Wish It Would Rain         5.0
Kilka usciskow kilka snow    5.0
Name: rating, dtype: float64
```

5) Now we'll plot the graph of number of ratings.



6) We'll plot the graph of ratings.



7) We have also sorted the music on the basis of number of ratings so that user will get recommended songs.

title	rating	num of rating
Sunset Road	4.359589	584
Shake And Fingerpop	3.803536	509
Killa Soundboy	4.155512	508
Into Eternity	4.007890	507
Let Her Dance	3.156701	485
Cripple and the Starfish	3.656965	481
Lovefool	3.441423	478
Stranger in Paradise	3.858065	465
What's Going On	3.420259	464
Modern Crusaders	3.631090	431

8) We have done correlation with music user played, so that user will get the similar songs.

title	Correlation
(Sittin' On) The Dock Of The Bay	-0.288675
(arrow up)	0.225175
100 Ways	-0.084872
13 Steps Lead Down	0.267453
15 Step	0.462910

These are the songs recommended when people played “I Never Came Song”.

title	Correlation	num of rating
I Never Came	1.000000	114
Despite What You've Been Told	0.624417	101
Around the World in a Tea Daze	0.611052	132
Ghettomusick	0.587782	112
Victor Jara	0.568909	120

These are the songs recommended when people played “Dusty Roads”.

title	Correlation	num of rating
Dusty Roads	1.000000	236
Heart-Shaped Box	0.537958	198
Only You Can Make You Happy	0.492304	111
I Love You More Than You'll Ever Know	0.454740	171
Tel que tu es	0.445927	188

CONCLUSION

Recommendation systems are very prevalent nowadays and can be seen playing in the background of most websites and apps we visit. Whether we are visiting an e-commerce website like Amazon, a hotel booking website such as Trivago, entertainment apps like Netflix, YouTube and Spotify, recommendation systems are an inevitable aspect. The inevitability arises due to the need to stay more relevant in business, acquire more customers and deliver an absolutely fabulous customer experience. In our project, we describe and attempt at developing one such recommendation system. We took into account, the Collaborative filtering to better predict the user's behavior. In the development of this project, we sought to overcome the widely known problems and shortcomings of such a system.