

Personalized Music Recommendation System

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Abstract

The main aim of Music Recommendation System is to give proper meaningful suggestion to person for specific items based on users mood and interest towards particular items, MRS has seen a boom in recent years. The two most popular recommendation algorithms: 1) Content-Based Filtering and 2) Collaborative Filtering. The ContentBased method recommends music based on the user data, In Collaborative method we use rating and sharing of content between different users to recommend music. We take help to provide the music recommendation by contentbased method music subjective features are like the Speechiness, loudness and Acoustiness etc. are analyzed. Cold-start is the most common problem for new users. Here, most popular tracks are recommended to users to solve it.

Keywords: Cold-Start, Content and Collaborative based approach, Music Recommendation.

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I. INTRODUCTION

Music Recommendation System is a system which learn from the user's previous listening history and recommend songs which they will probably like to hear in future. We have implemented many algorithms to try to build an efficient recommender system. We have referred popular based model which was simple that can give amazing recommendation which user may pretend to be interested. CF algo takes preferences and tastes from many users are also implemented. To overcome info overloading problems, information filtering systems are required here. Recommendation is a subsystem of information filtering So

recommendation is the personalized way of predicting items as per user need from users' past history. The recommendation system helps users for getting required information within a very less time and saves time.

A. Content - Based Recommendation System :

Content based recommendation system provides prediction based on user or item information and past interests of user. Contentbased filtering selects users past interests for particular item. Upon examines the user interests, the system provides recommendation for the items that have highly similar kind of features related to user interest or items accessed in past.

B. Collaborative Recommendation System :

collaborative technique analyzes a large amount of data collected from user responses to an item as rating and then recommends items to user. Here, analyzing item content is not compulsory and information is shared between two users so The base of method depends on relationship between user and items and also on the rating feedback matrix where each element representing a specific rating on a specific items.

II. RELATED WORK

The existing systems using collaborative filtering have gained great heights. Generally, a recommender system consists of three main components - users, Admin, Database .This useful step aims to differentiating between music sense using basic information. There are various approaches to music recommendations, including: 1) Expert-based approaches that are based on human annotation of music data 2) Social based approaches that characterize items based on social 3) Content based approach that analyze the audio content for characterizing tracks. 4) Collaborative Filtering (CF) approaches that analyze listening patterns by many users, in order to create similarities across users and items . Among the above approaches, CF is mainly used in large scale recommendation activities and have received relatively good performance. However, music preference is subjective. So the assumption of the CF method that users with similar listening behaviour have similar taste on music is Vulnerable. CF also suffers, it can hardly recommend a new song that no user has ever listened to. A contentbased personalized musicfiltering system gets the user's choices by finding the melody of patterns from music items in user's past access history. Using these melody of patterns, a melody preferences and classifier is been constructed for each user.Theincoming music item can be recommended to the user if it is diffrentiated into the suitable class. In this system, only the pitch information is considered for feature extraction. Ignoring other information, e.gduration,loudness, provided in In th system, only the highest necessary information is considered for getting feature .

III. EXISTING METHODOLOGY

1) Natural Language Processing :

Each artist and song can have thousands of terms describing them. Each one has an associated score, which describes how significant that description is for a song/artist. These tags or words are added to the model of each song and artist, which is then used for modeling what song to recommend to a user.

2) Collaborative Filtering :

Collaborative Filtering is a technique used by a recommender system. Collaborative filtering is a method of making automatic predictions (filtering) about the interests of a user by collecting preferences or taste information from many users (collaborating).

The underlying assumption of the collaborative filtering approach is that if a person A has the same opinion as a person B on an issue, A is more likely to have B's opinion on a different issue than that of a randomly chosen person.

These predictions are specific to the user but the information is gleaned from millions of users.

IV. PROPOSED METHODOLOGY

Sentiment analysis and profile building using users' Facebook data : -

This provides you a way by which you can get data from the Facebook platform or you can put data to the Facebook platform. It's a REST API and used to query data, your ads on Facebook, upload Photos and Videos, post any of your new stories to Facebook programmatically. If you want to get other users' data then for this you need to take several permissions from users. You have to implement OAuth protocol to achieve this. User data from Facebook is used for profile building of user. Profile building is a phase in which desirable characteristics are collected after sentiment analysis of user's Facebook data.

Facial recognition :

For more dynamic suggestion we can use facial emotion detection if user uploads the photo of his/her face. In this, we will use CNN in the context of emotion recognition. CNN is implemented to construct a computational model which classifies emotions into 4 moods like happy, sad, and angry.

K – Mean Clustering :

K-mean is a partitioning based algorithm used to cluster music objects according to attribute value wise.

Clustering Concept : The objects within a group need to be similar to one another and different from the objects in other groups.

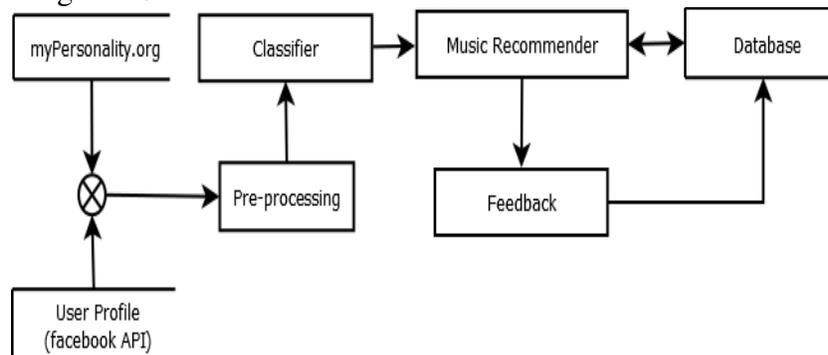
K – Mean Algorithm :

Algorithm :

- 1) Select k points as initial centroids.
- 2) Repeat.
- 3) Form k clusters by assigning all points to the closest centroid.
- 4) Re-compute the point of each cluster.
- 5) Until the centroids don't change.

User Playlist :

This module contains a list of music object in user profile. The Tracks downloaded from Spotify website is stored into database along with 9 feature attribute value.



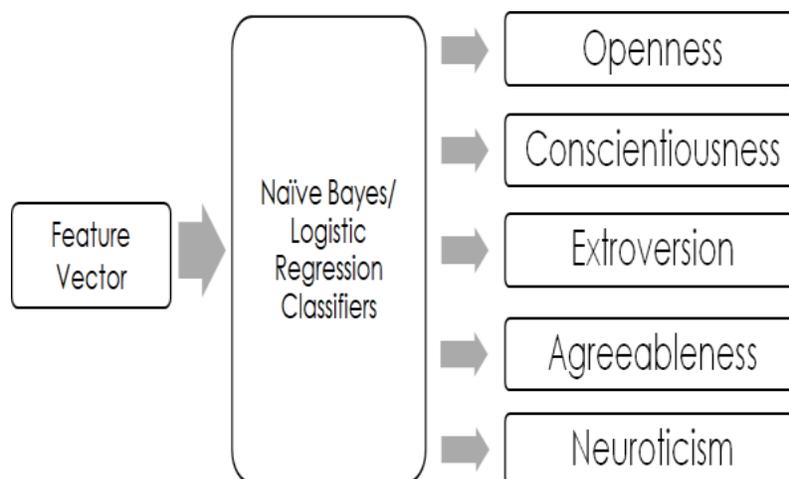
Pre-processing Unit/Data Preprocessor : The subsystem will be responsible for the converting, the status update of the user from the dataset and as well as user logged in via API into vector representation, via the use of set of word and TFIDF model. It is responsible for :

- Tokenization
- Lower casing the status update.
- Stemming
- Filtering out stop words
- Filtering the different parts of speech
- Conversion of textual data into the vector representation.

Classifier: After the representation of the vector status update, this subsystem can predict responsibly the personality of user. Classifier are designed by the admin in the system by the help of the dataset in order to guess a personality. In our project there are two classifier model used for the personality classification of user.

They are:

- Naive Bayes classification model
- Logistic Regression model



V. ALGORITHMS

1) Sentiment analysis algorithms :

1. Universal sentence encoder :The Universal Sentence Encoder encodes text into high dimensional vectors that can be used for text classification, semantic similarity, clustering and other natural language tasks. The model is trained and optimized for greater-than-word length text, such as sentences, phrases or short paragraphs.
2. BERT :BERT makes use of Transformer, an attention mechanism that learns contextual relations between words (or sub-words) in a text.
3. NNLM : Neural-Net Language Models (NNLM) address the n-gram data sparsity issue through parameterization of words as vectors (word embeddings) and using them as inputs to a neural network.

2) ANN (Artificial Neural Network) :

The Artificial Neural Network receives the input signal from the external world in the form of a pattern and image in the form of a vector. Each of the input is then multiplied by its corresponding weights (these weights are the details used by the artificial neural networks to solve a certain problem). This model is used for combining sentiment model and historical analysis model.

VI. LITERATURE REVIEW

- I. Recommender System has been a well known problem research domain. It has been various practical applications and also defined as a systems which will promote recommendation of the people and useful in promoting recommendation of products or services.
- II. In 2008, there was Recommender System which was on personality traits of user that has been published, experimenting on recommender system with the personality. They started recommending a user in a election scenario.Recommendation was based on the fact of that psychological aspect of candidates and and simple person, imaginary user who they dreamed as ideal choice.
- III. Also during 2014, Enhancing Music Recommender System with Personality Information and Emotional mood has been published, that researches to increase the music recommendation by including personal as well as emotional mood of user. The showcase, suggest that a nice insight on what engine can be useful with the personality by using the series of steps.
- IV. During 2016, A Comparative Analysis of Personality BasedMusic Recommendation System was published which gives a starting study by having information about target choice of user's personality in MRS. It had proposed nearly 5 different kind of modelforthe personality based music MRS.

In this project, we wish to continue with the ongoing study of A Comparative Analysis of Personality Based MRS whereby, Then we will try to study the causes of personality based system on CF.

VII. FUTURE WORK

Using dataset recommendation process take more time to execute as sequential approach, so will make parallel approach using Hadoop Environment for future perspective .

VIII. CONCLUSION

For Content-based Recommendation, When a query is performed on Cluster Centroid into database, attribute value of cluster centroid is matched with track attribute value. If it matches, then recommend it to the user. If no music is available in the user playlist then, according to popularity, track music would be recommended to users (Cold-start problem solution).

For User Grouping Based Recommendation, K-Nearest Neighborhood Algorithm is used using Cosine Similarity and Predicted Rating to recommend track. Here, MovieLens dataset is used to provide a huge number of ratings for User Playlists. To provide proper classification Movie Genre is mapped to Music Genre. So, Quality of recommendation is achieved.

Sentiment analysis of facebook dataset is effective solution for profile building which will help in reducing cold start problem which is currently occurring in music recommendation system. Also, mood analysis of pictures provided by user can be used to improve the accuracy of current music recommendation system.

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