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MUSIC RECOMMENDATION AND CHARACTERIZATION USING SOM

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Abstract- **Recommender system as a decision making strategy for users under complex information environment. In today's world information/data/resource generated in huge form through production system. The key to a good recommender system lies in its ability to provide good recommendations that are new, unexpected, trust inspiring and somewhat transparent. This paper proposed the recommender system for Music Recommendation and it will recommend songs to the users based on their preferences, using Self organizing maps algorithm. The proposed model integrates the use of Self organizing maps algorithm, based on artist, genre and ratings. Several iterations are undergone to identify performance of model.**
Keywords – Recommender system, neural networks, Self-Organizing maps

I. INTRODUCTION

Recently, with the rapid progress in information processing, communications, and storage technologies, the amount of information that we deal with in our daily lives has vastly increased. [2] Recommender system offers information to people in ways they are interested in as many users have different views to certain items. In music, the recommender system will recommend songs based on the musical features extracted and trained to differentiate the songs in terms of their rhythmic and genre or artist type. [4] Music is an art that weaves together the sound of the voices of the singers and the playing instruments, into a symphony of entertainment for the ears. Music is a part of entertainment to which people enjoy and based on their tastes have different preferences toward life and music. Music represents all the possibilities that could happen to the voices, sounds and silence, organized into a series of meaningful notes and melodies to the people who are listening to the songs. [1] Our proposed Music Recommender System will recommend songs to the users based on their preferences and mainly on what kind of songs they like. [5] It consists of songs of different artists, genres etc. For example, in restaurants, music listeners will probably find similar music of the same genre, but sometimes everyone has different interpretation of the music genre, so it can cause confusion. A restaurant may have some music theme for different times of the day, such as vibrant music during the day and soft music in the evening and night. [11] In Neural networks, various songs that are ranked or selected will sequentially activate corresponding nodes to recommended songs that are similar to the selected song of the user. [10] The songs will be trained for musical features to be used for recommending songs. A node connected to a set of active nodes becomes active itself when its input value is above some firing threshold.the music recommender system will recommend songs by using the Java Audio Feature Extractor which will extract the musical features of all songs; and based on them, the Self-Organizing maps algorithm will recommend songs in the form of clusters by training the musical features and finding the Euclidean distance between them in the songs to which many clusters will contain various songs after the training phase of Self organizing maps.[14]

II. EXISTING RECOMMENDER SYSTEM

Music recommender systems have been recommending songs based on genre, artist or mood of the users who are interested. Music listeners love listening to songs and have various tastes to which they love certain songs. However, the problem now is to organize and millions of music titles and music songs that makes music recommender systems inefficient because it is difficult to

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organize so many songs. [5] The music recommender system is to help people in a place to listen to the songs of their likings with the help of self-organizing maps that will recommend songs in the system. [3]

III. PROPOSED RECOMMENDER SYSTEM

The proposed recommender system involves Self-organizing maps using neural networks which contributes to the clusters of different songs after training the musical features of them during the Self-organizing maps phase. [2] The musical features will be extracted using Java Audio Feature Extractor which focuses on the rhythmic pattern based features of the songs. Based on the features extracted the Euclidean distance between the songs will be calculated and the recommender system will form clusters of these songs to which they will be recommended to the user. The recommender system will recommend songs with better efficiency to the listeners according to their preferences. [6]

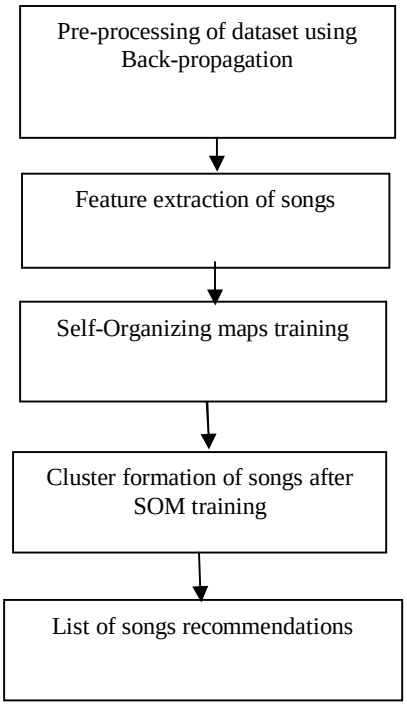


Fig: Block diagram

A) Neural Networks

Recommender system recommends songs based on various categories. So data in these systems consist of very large quantities which can be difficult to handle. [9] Neural networks offer its help because of its faster training with unsupervised algorithms that will divide data and perform operations on them. The neural network is formed and modified by various items or articles the user has accessed, which he/she has liked or disliked [4] A recommender system using neural networks will work when the user picks a choice and based on that choice the link between two nodes is established between the selected node and the node that is closest to the selected node in terms of the properties of the choice. [8] The songs will be divided for training and testing parts in the system. It basically consists of some neurons in input layer, hidden layer and output layer. For the training phase, 70% data is used and for testing 30% is used. After this the self-organizing maps algorithm is used for recommendations in the system.

B) Feature Extraction

Features are used for recognizing the categories of the recommender systems to which various items are distinguished. In a music recommender system, musical features are used for categorizing songs during the training phase. [12] Features like sound, loudness, spectral masking effect and sound clash (two sounds at the same time) are examined in this extractor to which accurate recommendations can be made. [6]

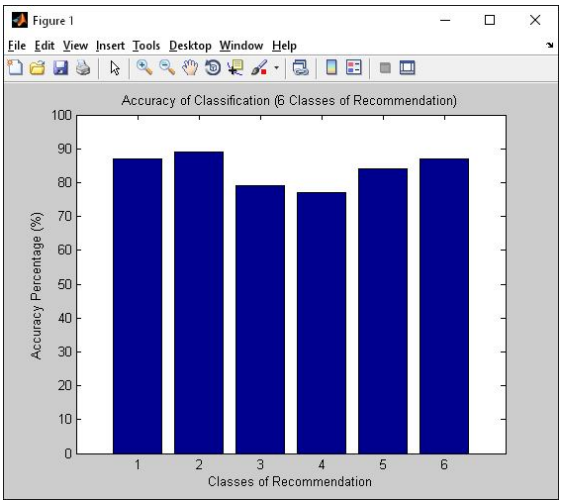
For this purpose, the Java Audio Feature Extractor is used which will extract the musical features of the songs that are needed for recommendations. The Java Audio Feature Extractor is used for extracting musical features of the songs in the recommender

system. This extractor will extract the rhythmic patterns of the songs to which these features will be trained and recommendations are made. [11]
The features consist of the rhythmic patterns out of which they are defined by how the singer has sang the song, how loud the music background is or how much intensity is the sound being played in it. [12]

C) Role of SOM

The self-organizing maps algorithm being a clustering algorithm is used for recommendations based on the various features of the songs that they have. [15] For recommending songs in this algorithm, the Euclidean distance is calculated between two songs whose features were extracted using the Java Audio Feature Extractor and they will be compared to which clusters are formed. [14] It is a part of competitive learning networks. The Self-Organizing Map is an unsupervised learning algorithm which needs no intervention during the learning phase and the characteristics of input data is less known. [8]
The results of which recommendations are made will be based on which songs that are being trained are appearing in the same cluster or are getting recommended as a different cluster using Self Organizing maps because of the neural network behaviour being random. The Self-Organizing maps. [7]

IV. RESULTS AND DISCUSSION



During the training and testing phase, 70% data is used for training and 30% is used for testing. In the fig, one axis represents the number of clusters obtained after execution and the other axis represents efficiency. It represents accuracy of classifications made in clusters by self-organizing maps in recommender systems. Self-organizing maps is used for training the musical features that were extracted and then used for recommending songs in various classifications (clusters). After performing several iterations, the outcome of the result is the different clusters that contain the recommended songs. Every cluster can have different songs depending on the algorithm training in the system.

V. CONCLUSION

The Music Recommendation System will recommend songs to the users based on their preferences, using Self organizing maps algorithm. This proposed system will generate recommendations that can be useful for public places mainly restaurants so that songs can be easily managed based on the musical features extracted.

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