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Taxonomy of Bollywood & Hindi Music in Reference to Mood

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Abstract: ***Music is always related to emotions of everyone in India. Shortly mood decides songs to listen. Music classification is vast area for researchers & scholars of computer science & electronics communication. A lot of research have done in this area. In this paper we present a system which is suitable for discriminating or classifying songs according to mood taxonomy, we choose Thayer model for this classification. We provide definitions of various audio features used to classify Hindi music. We give definitions of general audio terms and various parameters of Hindi music. We also justify our chosen classification algorithm and full description of that algorithm. After that discussed the full aspect of proposed system. In this paper present a result and result analysis of our chosen approach or proposed system. We also write some future scope of our work. This system will help researchers and software developer to classify Hindi or Bollywood music according to mood model.***

Keywords: Music-classification, Mood-classification, Audio-Features, Hindi-Music, Music-Taxonomy

I. INTRODUCTION

Music is the core element of Indian culture. In India there are strong relationship of human Various type of songs are available for every situation and every emotion. Love songs for couples, Patriotic songs for Independence Day, songs for meditation. And various songs means like gazals, geets, devotional songs, Mushayara and more. Various types of songs is written or sung to presents the emotions. So in brief music is directly or indirectly related to mood.

This paper presents a continued study of previously discussed paper in which we proposed a model to generate playlist in accordance to mood[1].

In next section we present the chosen mood model and hypothesis relates to mood category and music. in section 3 we discuss the various audio features and related parameters. In section 4 write the detail note on chosen data mining techniques. in section 4 give the result of this new proposed system and analysis the result with help of graph and calculating efficiency. After that in next section conclude the whole paper and write the benefits of this approach. Discuss the various future scope in next section. In last section write the various references used to write this research paper.

II. MOOD MODEL

Various mood model is available like Hevner's & Russell's mood and more. But to classify mood we choose Thayer's mood model [2] they classify mood in eight categories sad, calm, depression, contentment, energetic, exuberant, frantic, and happy. Fig1 shows the taxonomy of mood according to Thayer. Basically mood & music have proportional and reciprocal relationship both type. Like when person happy so love to hear happy songs but when depressed so love to hear motivational music.

In this paper we choose Thayer's mood taxonomy means 8 categories of mood and also some inverse relationship like we develop a system in which if user has depressed or tensed mood so we generate playlist of motivational music.

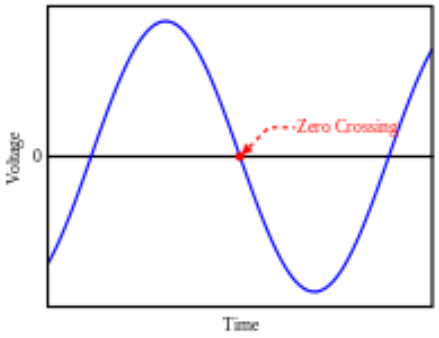
Audio Features Extraction

Songs contain various information and features like Tempo, Timbre, Pitch and Intensity. and some technical parameters like root mean square(RMS),Zero Crossing, FFT, Frequency, compactness. Definition of these features are below:

1. Timbre: Timbre is an identity of any sound [3]. It shows the quality of sound, tone and any musical note. Zero Crossing Rate parameter & Compactness are used to calculate Timbre.
2. Pitch: Pitch is lowness and highness of an audio. In simple term it is the vibrations which affect the quality of sound. It is directly or indirectly related to frequencies of an audio.
3. Tempo/Rhythm: Rhythm means music in reference to time. Repeated pattern of an audio in reference to time is Rhythm. The speed of any music clip is tempo. Spectral variability is used to calculate tempo. Tempo is related to beat spectrum and frequency.
4. Intensity: Power and strength of an audio are known as intensity. It is measured is terms of RMS value. More RMS value of songs pointed to more intensity of songs .

Other related terms of audio and their description are below:

- Zero crossing: Zero-crossing rate can be known as amplitude of an audio passes through a value of zero at given time [4]. Zero crossing rate is the rate at which signal reached on zero crossing.



- Root Mean Square (RMS): It is a way of measuring the average values of signal over a fixed time duration.it is calculated on the basis of window size [5].
- Compactness: -It is directly related to Spectral Smoothness. It provides detail of signal's noisiness [5].
- Spectral Variability: It is used to measure the changes of audio or wav file's spectrum in reference to time.
- Strongest Frequency: It shows the highest value of frequency, which is helpful to measure the audio type. It is a very helpful to classify music file.
- Fast Fourier Transform (FFT): It gives frequency related data or function of frequency [6].FFT a process for transforming digital signals between the frequency and time domains.

Classification-Algorithm

Classification is data mining techniques to discriminate data with the help of some attributes. Classification is a supervised learning approach. To implement our system we choose j48 algorithm. J48 is a way to implement decision tree and solve the data mining approach. Decision tree is the structure similar to Tree and having nodes with considering attribute values, Number of attributes decide the level of Tree. J48 decision tree is created by using and implementing ID3 algorithm. There are few advantages of this approach [8]. It gives fast result and good in redundant data set. As we all know everyone stores song in huge amount, so there are lot of chances of redundant data so this is one of the reason behind choosing this algorithm. There is no need to normalized data set, it creates analysis work easy to implement.

Experimental Setup

To do our research work firstly we choose some Hindi and Bollywood songs with different mood taxonomy. Song and their mood are decided by the help of various websites and group of my friends. After that download those songs and convert them into wav format because we were using jAudio tool for feature extraction and it supports only wav format of songs. These all songs are 16bit. 16000 Hz and mono channel supported songs. We choose songs with no limit and no frame creation and clip is required. We perform our research work on complete songs. Then extract audio features discussed in the previous section with help of open source tool jAudio, save this data in arff format and after that perform the classification algorithm on that data with help of Weka tool. Weka is the highest service tool provider for data mining for classification and clustering as well as analysis purpose [7]. We suggested two algorithms in our proposed paper naïve Bayes and decision tree, so we do our work with help of these two but we get good results with Decision tree.

III. RESULT ANALYSIS

We have taken no. of songs of various 8 categories and then extract audio features which affect the emotions and apply decision tree j48 algorithm for classifying these songs according to mood. In table 1 we show the concluded result. First column shows the various mood classification according to Thayer's mood model , In column two write the no. of songs for each category used to classification purpose , in column 3 total correctly identified songs and in column 4 calculate the efficiency on the basis of column 2 & 3 and represent in percentage form.

Table 1: Result conclusion

Mood Taxonomy	**Used no. of songs**	**Identified no. of songs**	**Efficency %**
CALM	8	4	50
HAPPY	10	8	80
CONTENTMENT	10	10	100
SAD	10	7	70
ENERGETIC	8	6	75
EXHUBERANT	4	2	50
DEPRESSION	11	11	100

FRANTIC	9	7	77.778

According to result shown in table 1 we can also say that our chosen approach gives accurate result of contentment & Depression mood category. And has limitation in exuberant and calm mood category. The average success rate of this algorithm is about 78 %. Compare to other existing system it is good but have some chances of improvement. There are other algorithm also presents which give good result on western music & Chinese music. But this work is totally on Hindi and Bollywood music.

IV. CONCLUSION

This paper is a continuation work discussed in the previous paper[1] which proposes a model to generate playlist of songs according to work and discussed the previous work or literature survey. This paper gives a summary of whole research work which helpful to discriminate songs according to human emotions or mood. Various section of the paper discussed various parts of research. Section one gives a brief detail of whole work. Section two define mood model after that in section third wee discuss audio features and their definitions. In next section write the j48 decision algorithm. In other section we write about the environment setup which we arrange to do our research and finally gives result analysis. This research gives a 78% success rate. It will be helpful for developers to make a music player which classify songs according to mood.

V. FUTURE SCOPE

A lot of researches are done in this area and in future there is a lot of chance of research in this area. In this work we consider only Hindi Bollywood music, we can also check this system for Hindi classical, western music , folk and Chinese music. This is the way of implementation of proposed model which generate playlist in reference to mood, we can also make websites and app which can do same job on large collection of songs. Our system gives only study & analysis not suitable for users because this system contains low graphics. So by adding GUI we can develop this system for everyone.

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