

Mood Based Hindi Songs Classification System Invariance of MFCC Feature Extraction Technique

Jadav Komal K.

PG Student, Computer Engineering Department,
Darshan Engineering College, Rajkot, India

Abstract - Listening music in spare or free time is one of the best choices for most of the people. Music and Mood are closely linked together. Music shares a very special relation with human emotions or feelings. People are use to listen songs as per their mood. This paper proposes Hindi songs classification system based on mood using MFCC value of audio clip. MFCC value mainly gives the power value of song. Based on that value classification algorithm is applied to check whether that song belongs to which categories like happy, sad, romantic kind of mood based songs are addressed from dataset.

IndexTerms –MFCC, music, mood detection, Music classification system .

I. INTRODUCTION

Music Information Retrieval (MIR) is growing field of research with many real-world applications. Those involved study of musicology, psychology, music study, signal processing or some other combination of these. MIR mainly focuses on music content, music similarity and music psychology areas. [1] Generally we select a music based on our interest, artists, albums and music types. There are many choices available but day by day our choices might be change. Currently user use to listen music as per their mood or emotion. They select music which best suited for their mood at that instant [2]

The relation between mood and music, music emotion detection and classification has been extensively studied and researched earlier. Mostly pattern recognition approach was preferred. The extensive work done in this field does scope of specifies a scope of improvement in the choices of audio features as well as classification for better accuracy [8]. Most In case of mood it signifies the emotion of that particular music part. Most of analysis done in the field of music mood categorization has been observed with respect to non-Indian music. [2] Music being subjective to cultural background. For that might need different types of music. My goal is to develop a mood based music classification system for Hindi songs by analysis of MFCC value of audio file. Grouping of songs might be done by using clustering algorithm like k-means. [2]

II. PROPOSED SYSTEM

A. Basic Concept

The prime goal is to categorize the songs into different types of moods. Below figure shows a list of popular user's moods that identified currently for this research work.



Fig 1. Popular user's Moods

Songs with similar properties or feature range will be grouped together to yield a particular mood, Hence a mood based playlist will provide to the user.

B. Preprocessing

At initial level, I selected 200 Hindi songs dataset is created by me which contain Title of songs, movie name, artist of songs, MFCC value and year of songs. I wanted to define the mood of particular song based on the generalized view of human mind. The survey was concluded and result was tabularized so to set the range of threshold for each mood.

C. Feature Extraction and Selection

JAudio was used for the feature extraction process^[4]. There are number of features that are common across all classes. The extracted features fall into categories like: Timbre, Intensity, Rhythm. In which I selected timbre feature. Timbre feature can used to judge whether the emotion is negative or positive. Happy songs usually bright and vibrant, while grief ones sound pensive and gloomy. The timbre Features are listed as follows: Centroid, Rolloff Point, Flux, Zero Crossing value, MFCC, LPC, Strongest Frequency via Zero crossing value, Strongest Frequency via Spectral Centroid, Compactness In which I work on MFCC feature^[5].

Why MFCC?

MFCC is Mel- Frequency Cepstral Coefficient are Coefficient that collectively make up an MFC. They are derived from a type of Cepstral representation of audio clip. The MFC frequency band are equally spaced on the Mel-Scale which approximates the human auditory system's response more closely than other features used in normal Cepstral. This frequency warping can allow for better representation of sound^[3].

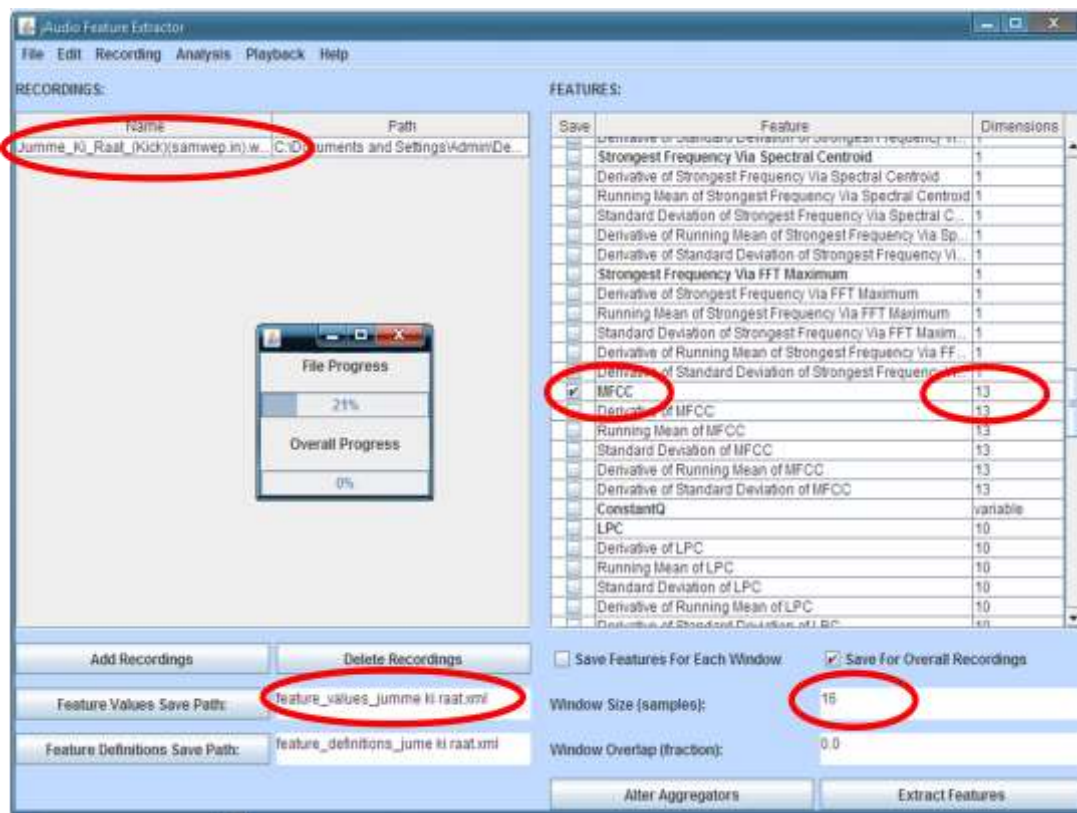


Fig. 2 GUI of JAudio

D. MFCC

The Mel-frequency cepstrum (MFC) is a representation of the short-term power spectrum of a sound, based on a linear cosine transform of a log power spectrum on a nonlinear Mel scale of frequency. The name Mel comes from the word melody to indicate that the scale is based on pitch comparisons. MFCCs are a normalized energy parameter of audio.^[3]

A popular formula to convert f hertz into m Mel is^[3]

$$m = 2595 \log \left(1 + \frac{f}{700} \right)$$

MFCCs are commonly derived as follows.^[3]

1. Take the Fourier transform of (a windowed excerpt of) a signal.
2. Map the powers of the spectrum obtained above onto the mel scale, using triangular overlapping windows.
3. Take the logs of the powers at each of the mel frequencies.
4. Take the discrete cosine transform of the list of mel log powers, as if it were a signal.
5. The MFCCs are the amplitudes of the resulting spectrum.



Fig.3 Process of Calculation of MFCC

III. SYSTEM ARCHITECTURE

Step 1: The mp3 file of song that contains Music is to be given as input.

Step 2: The music is processed under feature extraction procedure using JAudio Framework where relevant features for mood classification are been extracted.

Step 3: The extracted features are then to be stored in repository. Main Classification Procedure is applied on extracted features' values.

Step 4: Thus Range is been generated which will be useful to decide category of mood. Now based on that range song is been assigned to particular category of mood.

Step 5: As next whenever user searches for song by its mood, the results will be generated by searching procedure of repository.

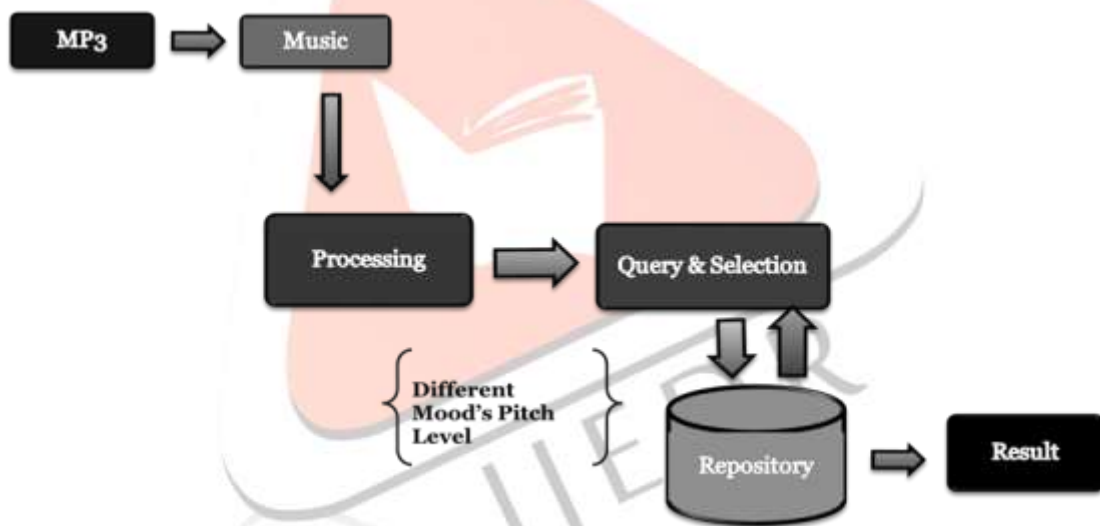


Fig.4 Proposed Architecture

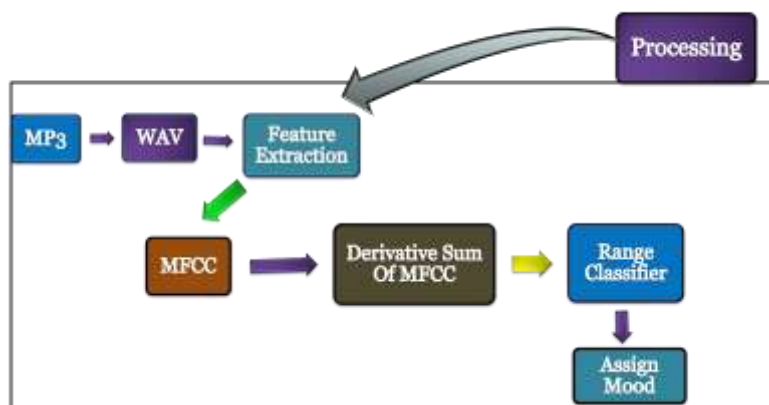


Fig 5. Processing Workflow

IV. RESULT AND ANALYSIS

Based on trained dataset of 200 Hindi songs the range classifier is to applied using weka tool. With the help of k-means classifier the range of each mood with it's particular boundary is to found. , the ranges of top 10 moods are shown in table. As perspective of instrumental structure of various moods contains ranges are also shown that kind of **peaceful** and **calm** which is having kind of same texture composition are in nearer range of each other.

Table 1 Range of Moods

Mood Name	Range
Party	45-55
Playful	56-64
Dance	65-78
Clam	78-82
Excited	83-88
Romantic	105-129
Sad	134-157
Cheerful	130-165
Peaceful	166-270
Fusion	No Range

Based on trained Dataset , value of each kind of mood, and based on value of true positive, false positive, false negative, accuracy in terms of Recall, Precision and F-square is calculated which is shown in Table^[6,7]. Calculation shows that accuracy of Peaceful is higher than any other that subsequently decreases by Romantic, Dance, Playful, Party, Cheerful etc. and least of Sad kind of songs. All over 77.50 % Accuracy is achieved by this system.

Table 2 Accuracy measurement by Precision, Recall, F-square

Mood Name	Recall	Precision	F-square
Party	0.0869	0.92	0.8330
playful	0.08	0.9259	0.8459
Dance	0.0740	0.9310	0.8569
Clam	0.8571	0.5384	0.6282
Excited	0.8888	0.5294	0.59558
Romantic	0.0454	0.9565	0.91106
Sad	0	0	0
Cheerful	0.1379	0.8787	0.74085
Peaceful	0	1	1
Fusion	0	1	1

A	B	C	D	E
song_title	movie_name	artist	mfcc	mood_type
Maria Maria	Partner	Sonu Nigam Sajid Sunic	48.3	Party
Ah Dil Kya Mehfil Hai	Hum Kisi Se Kam Nahi	Kishor Kumar	48.4	Party
Dil Ka Bhavar	Tere Ghar Ke Samane	Mohmad Rafi	48.6	Cheerful
Subhanallah	Yeh Jawaani Hai Deewa	Sreeram	63	Playful
Neele Neele Umbar Pe	Kalaakaar	Kishor Kumar	63.2	Playful
O Manjhi Re	Khushboo	Kishor Kumar	64.7	Sad
Yar Na Miley	Kick	Honey Singh Jasmine	66.7	Dance
Vele	Student Of The Year	Shekhar Rajviani	67.6	Dance
Shake It Like Shammy	Hasee Toh Phasee	Benny Dayal	68.3	Dance
Man Mohini	Hum Dil De Chuke Sana	Shankar Mahadevan	78	Fusion
Chalo Na Naino Se	Bol Bachchan	Himesh Resamiya Shrey	84.2	Excited
Galat Baat Hai	Main Tera Hero	Javed Ali Neeti Mohan	84.3	Excited
Tu Hai Ki Nahi	ROY	Arijit Singh	84.5	Calm
Likhe Jo Khat tuje	Kanyadan	Mohmad Rafi	91.3	Playful
Halke Se Bole	Paa	Child Group	92	Playful
Hamadard Hai	EK Villan	Mohmad Irfan	92.01	Playful
Iktara	Wake Up Sid	Rekha Bhardwaj	106	Romantic
Tere Naina	My Name Is Khan	Shankar-Ehsaan-Loy, S	106	Romantic
Raabta	Agent Vinod	Sherya Ghosal Ash King	106	Romantic

Fig.6 Dataset of Moods and Songs

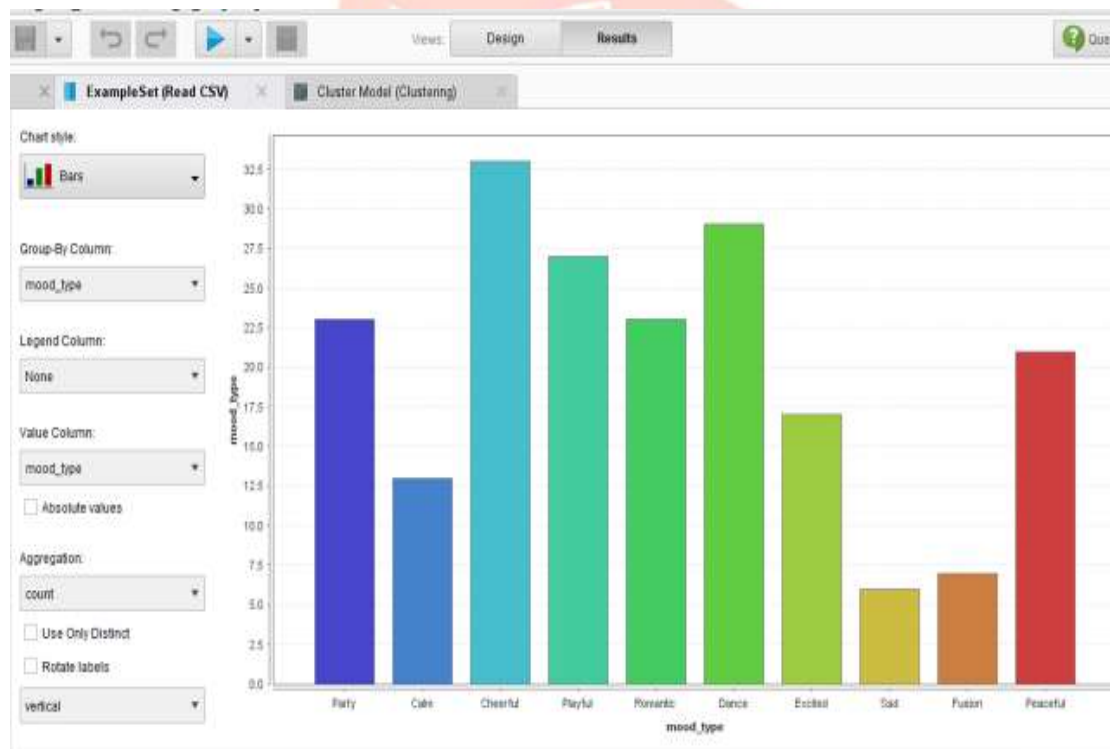


Fig. 7 Accuracy of Moods

V. CONCLUSION

This music mood classification surely be unique one in the field of Hindi music and also for music retrieval. It's also for beneficiary for commercial application. Here k-means algorithm is used for classification instead of k-means algorithm we can use SVM algorithm and compare both the result. If someone build an application that make user interaction than research leads to normal human application.

REFERENCES

- [1] MusicInformationRetrieval”,https://en.wikipedia.org/wiki/Music_information_retrieve
- [2] “Mood based music categorization system for Bollywood music”,Amey ujlambkar, Omkar upadhye, Akshay deshpane, Gunwant surywanshi,volume-4,number-1,Issue-14,march-2014
- [3] “MFCC”http://en.wikipedia.org/wiki/Mel-frequency_cepstrum
- [4] “jAudio” <http://jmir.sourceforge.net/jAudio.html>
- [5]”Audio Features” <http://www.audiomountain.com/tech/audio-file-size.html>
- [6] “F-sqaure”, <http://en.wikipedia.org/wiki/f-sqaure>
- [7]”Precision Recall”, http://en.wikipedia.org/wiki/precision_recall
- [8]vallabha Hamiholi-“A method for music classification based on perceived Mood Detection for Indian Bollywood Music”,world Academy of science ,Engineering and technology,vol:72,2012

