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Recognition in Indian Music Raga's using RBFNN

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Abstract: Hindustani music and Carnatic music are the two major types of Indian classical music that are performed. Raga is the fundamental concept in Indian music on which whole melody of a performance is based and comprises of group of swaras ranging from 5-8 notes. The Raga is the base of Indian Classical Music. The behaviour of the Raga is recognized by Swara notes movement. The Raga may be sung as per emotions, environmental situations and events at a particular time. The Mel Frequency Cepstral Coefficient (MFCC) features extraction technique from the Digital Signal Processing. This paper describes a technique that uses Radial Basis Function Neural Network (RBFNN) to recognition Indian Music Raga's. The proposed feature extraction and classification models results in better accuracy in recognition Indian Music Raga's.

Index Terms **- Music Signal, Raga's, Feature Extraction, Mel Frequency Cepstral Coefficient (MFCC), Radial Basis Function Neural Network (RBFNN)**

I. INTRODUCTION

Content-based music information retrieval system is the ongoing current research area. Developing the system for Indian classical music recognition is a challenging task. Indian classical music has two basic forms such as North Indian or Hindustani and South Indian or Carnatic music. The music expresses the feelings with the different movements of the sound. It is the most inspired and pure form of creativity by the humans. The experience of music gives the fun, diversion, unwinding and mental harmony to the people at the various snapshots of life. In the advanced world, the music has acquired regarded of recuperating psychological adjustment and actual weakness [1]. Machine learning has become very popular in recent years. Depending on the type of application and the data set available, certain types of machine learning techniques are more appropriate than others for different applications [2]. These Music Ragas are thoroughly connected to different parts of the day rendering to changes on the wildlife or growth of the specific feeling, mood or sentimentality in the human mind. Music is considering the best sedative on modern days of nervousness, tautness and high blood pressure [3]. The tuning of the instrument merges imperceptibly with the elaboration of the melody, which may spin itself out for two, three or more unbroken hours [4]. The Block Diagram of Proposed work is shown in Figure 1.

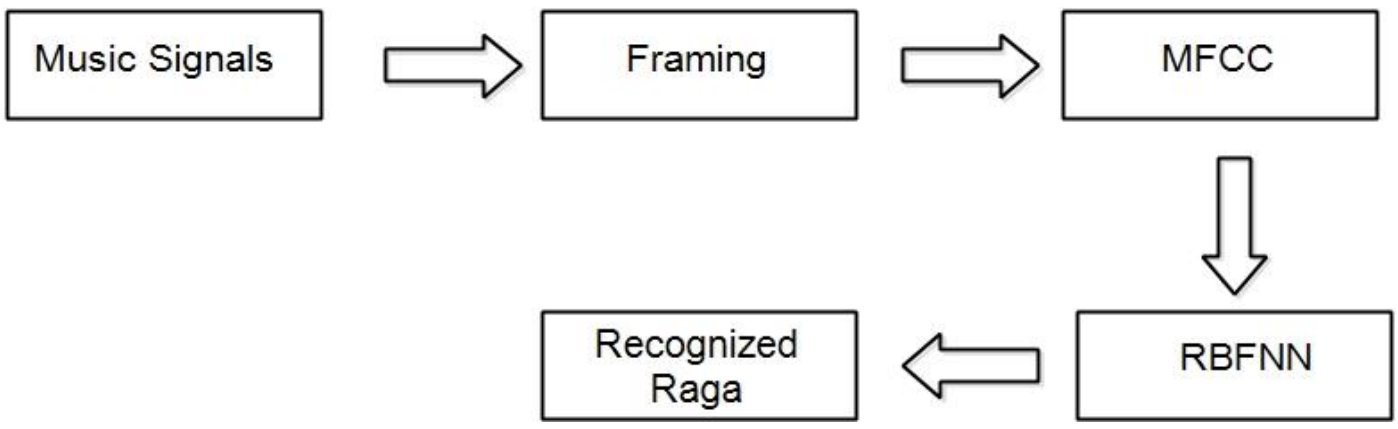

Fig. 1 Block Diagram of Proposed work

II. MEL-FREQUENCY CEPSTRAL COEFFICIENTS (MFCC)

Mel-frequency cepstral coefficients (MFCCs) are extensively used in music Analysis [5]. The Mel-frequency cepstrum has demonstrated to be exceptionally successful in perceiving construction of music signals and in displaying the emotional pitch and recurrence content of sound signs [6]. MFCCs depend on the known variety of the human ears basic data transfer capacities with recurrence, channels dispersed straightly at low frequencies and logarithmically at high frequencies to catch the phonetically significant attributes of discourse and sound [7]. The well-known Timbre feature is Mel Frequency Cepstral Coefficient (MFCC). The features are obtained by applying various signal processing techniques like Fourier Transform, Short Term Fourier Transform (STFT) and Wavelet Transform (WT). The pitch determines the fundamental frequency of the sound. In this work, a 14th order MFCC analysis is used to approximate the spectral samples and hence obtained a 14-dimensional feature vector for a music signal of frame size of 20 milliseconds is obtained.

III. RADIAL BASIS FUNCTION NEURAL NETWORK (RBFNN)

Classification is one the vital stage of the any recognition model. In the wake of assessing the ideal key component esteems we process these vector to classifier independently and noted down the general acknowledgment exactness. Spiral Basis Function Neural Network (RBFNN) has been utilized as a classifier. There are three layers in RBFNN network specifically: an info layer, a hidden layer and a result layer. In this paper, various examples of two English characters have been taken. In this way, there are just two results at yield layer. The results of result layer addresses whether or not the person has been accurately perceived. The design of multi-input and multi-yield RBF neural organization is addressed by Figure 2. The boundaries of a RBF type neural organization comprise of the focuses spread the premise capacities at the secret layer hubs and the synaptic loads of the result layer hubs. The RBF focuses are likewise focuses in the information space. It would be ideal to have them at each unmistakable point on the information space, yet for any practical issue, a couple of information focuses from all accessible focuses are chosen utilizing bunching [8].

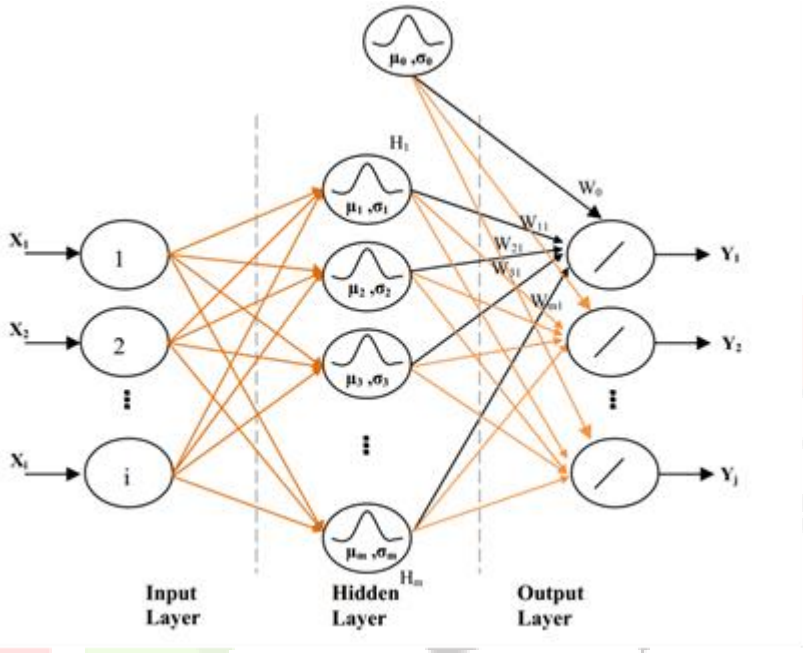

Fig. 2 RBFNN Architecture

IV. EXPERIMENTAL RESULTS

4.1 The database

The data is collected from Marsyas databases with distinct characteristics for genre classification. In our work dataset consists of 750 audio tracks each 40 seconds long. The tracks are all 22050Hz Mono 16-bit audio files in .wav format.

4.2 Acoustic feature extraction

In this work fixed length frames with duration of 20 ms and 50 percentages overlap (i.e., 10 ms) are used. The objective of overlapping neighbouring frames is to consider the harmonic information characteristic of audio content. An input wav file is given to the feature extraction techniques. MFCC 14 dimensional feature values will be calculated for the given wav file. The above process is continued for 750 number of wav files.

4.3 Classification

One category is appended for recognized and the other category is not recognized for the written character. By using the feature values with appended value RBFNN training is carried out. For testing the feature extraction is done on different used in the training set. The prediction errors of the validation patterns are larger because these patterns are outside the training space. The Figure 3 shows the comparison of various means in RBFNN.

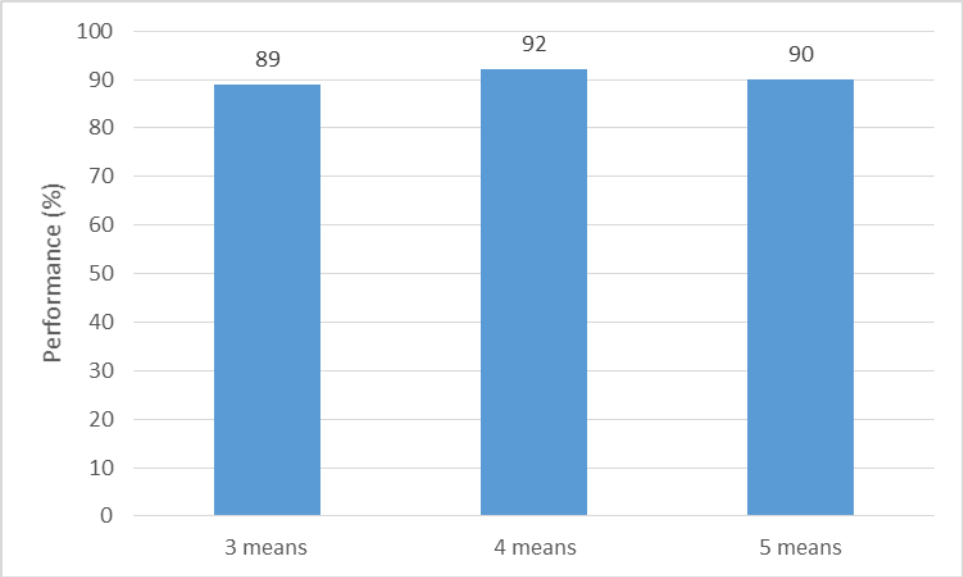

Fig. 3 Comparison graph for various means in RBFNN

V. CONCLUSION

In this paper, we have proposed a recognition in Indian music raga's system using RBFNN. MFCC is calculated as features to characterize music content. RBFNN learning algorithm has been used for a recognition in Indian music raga's by learning from training data. It shows that the proposed method can achieve better classification accuracy than other approaches. Experimental results show that the proposed audio RBFNN method has good performance in raga's recognition scheme is very effective and the accuracy rate is 92%.

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