ABSTRACT

India has been the cradle for music and employed music in every situation like religious rituals, celebrations, festivals etc. Millions of men and women are greatly benefitted by music in various ways from ancient times. Music is believed to usher in delight and peacefulness and healing is considered as its natural quality. It is believed that Carnatic music evolved in India 3000 years ago. Carnatic music is predominant in Southern part of India. Raga is the backbone of Indian music. Raga is the melodic framework for formation of melodies in Indian Classical music. The practise of using ragas in healing diseases is known as Raga Chikitsa. The impact of raga on mood and mind has been a subject of prospective research among Indian music community.

Carnatic ragas are broadly classified as Janaka ragas (Parent ragas) and Janya raga (child ragas). Janaka ragas, popularly known as Melakarta ragas consists of all seven notes (swara) in their melodic framework. Janya ragas are derived from Melakarta ragas by omitting certain notes it. There are seventy two Melakarta ragas in Carnatic music. Innumerable Janya ragas are possible from these seventy two Melakarta rags. Since the analysis over entire ragas of Carnatic music is not feasible, the study is restricted to Melakarta ragas of Carnatic music.

In this thesis, the therapeutic effect of Melakarta ragas of Carnatic music is investigated. The main objectives of the research work are:

- To verify whether the ragas are really suitable for curing diseases and to find out which Carnatic ragas are suitable for specific ailment.

- Characterisation and identification of Melakarta ragas

To achieve these objectives, initially a study on Melakarta ragas is done by investigating their characteristics. The research also focuses on identifying the features which can uniquely characterize the ragas. The effectiveness of Melakarta ragas in controlling blood pressure is scientifically validated.

Characterisation and classification of Melakarta ragas is carried out using Back propagation Neural Networks (BPNN). A new training function is proposed to enhance the performance of BPNN classifier.

A novel feature selection technique is formulated for classification of Melakarta Raga dataset, which classifies all 72 Melakarta ragas. The proposed feature subset selection algorithm, selects the set of features which can effectively distinguish all 72 Melakarta ragas. The efficacy of proposed method is tested on benchmark datasets and the results reveal that proposed feature selection method performs better compared to existing methods and be effectively applied to any type of dataset.

The musical features that influence each Melakarta raga and chakra is found using Neutrosophic Logic (NL). It is the first attempt to characterize Melakarta ragas of Carnatic music using neutrosophic logic.

Detailed signal processing analysis of Carnatic ragas is carried out. Through exhaustive spectral analysis and time domain analysis of all the 72 Melakarta ragas, certain facts are put forward to justify the precise arrangement of Melakarta ragas by the musical stalwarts of Indian music.

Usefulness of Melakarta ragas in influencing systolic and diastolic blood pressure in human is experimentally verified. The variability of heart rate after listening to Melakarta ragas are investigated in detail.