Abstract

When learning any form of classical music vocals without a teacher, even subtle deviations can lead to wrong training, which can be difficult to remedy in the future. In this research work, a real-time tool has been developed to deal with this situation by assisting people in learning Indian classical music. This tool will have a set of pre-defined *Swaras*, *Alankaras*, and *Ragas* (Indian classical music concepts). Users can practice any musical piece from this set and the tool will inform them of the mistakes they make, by smartly matching their voice with the dynamically defined pattern. Users are free to sing in any given scale, which they define in the beginning by singing the root note of their preferred scale.

Using the PredominantPitchMelodia algorithm, the tool identifies the pitch values of the musical piece. From these pitch values, the tool identifies the root-note and set it as a reference. This root-note defines the scale of the user's voice. Further, for identifying the simplest basic musical piece, the k-means clustering method has been implemented along with some index rearrangement. To identify any general musical piece, moving average, gaussian filter and step-detection algorithm have been implemented along with prominent step-filtering method. Voice stability and Pitch accuracy have been proposed to serve as the evaluation criteria. The functioning of the tool is testified on a varied range of audio samples, namely, male and female voices, Ukulele, and Harmonium audio samples and existing musical instrument tuning applications like GuitarTuna, Ukulele Tuner, and so on have been used as the ground truth for the verification.

For future work, the just intonation tuning method will be implemented as this method is mostly used in Indian classical music. Also, the tool can be formulated for different cultural music (western music, Chinese music, folk music etc.), medical purposes (brain-computer interface, neural disorders like schizophrenia etc.), meditation and for music composition.

List of Publications

1. “Design and Development of an Indian Classical Vocal Training Tool”, 2nd International Conference on Intelligent Autonomous Systems, 2019, (in press).