Abstract

The most common registers discussed in the singing are chest and head register. The proficiency of singers is measured by how smoothly they cross from one register to another, the more smoothly transition is the best the singer is. The purpose of this study is to investigate the acoustic characteristics of the chest-to-head register transition region. In addition, to describe in objective terms the acoustic mechanisms employed by singers during transition region. Therefore, spectral features that reflects voice quality were used, these features are: the first four harmonic amplitudes $H_1, H_2, H_3, H_4$. In addition, vocal tract formants $F_1$ and $F_2$ were used. However, there are many drawbacks for measuring spectral features especially for singing voices, due to, it is sensitive to different pitches and sensitive to different vowel qualities. To overcome these problems a feature extraction scheme was proposed. To validate the proposed method, a singing database of singing utterances for vowel [a] recorded by three groups of singers; Altos, Mezzo, and Soprano was used. Singers sung each utterance such that they start with sung vowel [a] using chest voice then change to head voice at the end. Extracting the 6 features and observing the change happened near the transition area. It was
found that, near the higher edge of the chest register, the characteristic feature for vowel [a] is: Tuning of F1 on H2 and of F2 on H4. Thus, H2 and H4 are the prominent harmonics of the chest register’s range. During the register transition, the tuning of F2 shifts from H4 to H3, leading to a characteristic reduction of the level of H4, together with an increase in that of H3 in the head register.

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Index Terms

Computer Science Signal Processing

Keywords

Register transition; spectral patterns; chest register, head register; singing voice.