

An Approach for Vocal Register Recognition Based on Spectral Analysis of Singing

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Abstract : Recognizing and controlling vocal registers during singing is a difficult task for beginner vocalist. It requires among others identifying which part of natural resonators is being used when a sound propagates through the body. Thus, an application has been designed allowing for sound recording, automatic vocal register recognition (VRR), and a graphical user interface providing real-time visualization of the signal and recognition results. Six spectral features are determined for each time frame and passed to the support vector machine classifier yielding a binary decision on the head or chest register assignment of the segment. The classification training and testing data have been recorded by ten professional female singers (soprano, aged 19-29) performing sounds for both chest and head register. The classification accuracy exceeded 93% in each of various validation schemes. Apart from a hard two-class clustering, the support vector classifier returns also information on the distance between particular feature vector and the discrimination hyperplane in a feature space. Such an information reflects the level of certainty of the vocal register classification in a fuzzy way. Thus, the designed recognition and training application is able to assess and visualize the continuous trend in singing in a user-friendly graphical mode providing an easy way to control the vocal emission.

Keywords : classification, singing, spectral analysis, vocal emission, vocal register

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