Analysis of a Modern Voice Morphing Approach using Gaussian Mixture Models for Laryngectomees

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Abstract

This paper proposes a voice morphing system for people suffering from Laryngectomy, which is the surgical removal of all or part of the larynx or the voice box, particularly performed in cases of laryngeal cancer. A primitive method of achieving voice morphing is by extracting the source's vocal coefficients and then converting them into the target speaker's vocal parameters. In this paper, we deploy Gaussian Mixture Models (GMM) for mapping the coefficients from source to destination. However, the use of the traditional/conventional GMM-based mapping approach results in the problem of over-smoothening of the converted voice. Thus, we hereby propose a unique method to perform efficient voice morphing and conversion based on GMM, which overcomes the traditional-method effects of over-smoothening. It uses a technique of glottal waveform separation and prediction of excitations and hence the result shows that not only over-smoothening is eliminated but also the transformed vocal tract parameters match with the target. Moreover, the synthesized speech thus obtained is found to be of a sufficiently high quality. Thus, voice morphing based on a unique GMM approach has been proposed and also critically evaluated based on various subjective and objective evaluation parameters. Further, an application of voice morphing for
Laryngectomees which deploys this unique approach has been recommended by this paper.

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Index Terms

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