INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH & DEVELOPMENT

ISSN 2278 – 0211 (Online)

Voice Conversion by Advance Method

Mohit Kumar
M.E. Scholar (Comm.) SSGI, Bhilai (C.G.), Chhattisgarh, India

Piyush Lotia
Associate Professor, HOD (E&I) SSGI, Bhilai (C.G), Chhattisgarh, India

Abstract:
Voice conversion is nothing but the modification of the characteristics of voice signal of one speaker (source speaker) so that it sounds as if it had been pronounced by different speaker (target speaker). In this method of Voice conversion we use the spectral characteristics such as frequency, power spectral density, amplitude etc. As compare to other methods this method provides more efficient transformation because in this method we are using more than one spectral characteristics.
Since, here we are using many characteristics of the signal so we can say that it is an implementation of frequency-warping-based voice transformation in which only the frequency of both source and target speaker are extracted and modify. Evaluation by objective tests and formal listening tests show that the proposed transform method greatly improves the quality, naturalness as well as noise information of the converted voice signal compared with other proposed transformation methods.
Over the last few years, the interest in voice conversion has risen significantly due to its wide application. Two main aspects of the transformation problem are voice quality and intonation.
In this paper, we focus on the control of noise which present in the voice. More significantly, our aim is to represent by an appropriate model, trained from experimental data, the statistical relations between the spectral envelopes of two different speakers uttering the same text. To differentiate this problem from the general voice transformation task, which would also necessitate a proper analysis and control of the characteristics of signal, we will refer to the control of the spectral envelop as spectral transformation.

Keywords: *voice conversion, frequency, spectral characteristic*

1. Introduction

Voice signal convey a wide range of information. Among them, the meaning of the message being uttered is of prime importance. However, secondary information such as speaker identity also plays an important role in oral communication. Voice modification technique attempts to modify the voice signal uttered by a given speaker so as to alter the characteristics of his or her voice.
In our daily life the individuality of voice is useful because we can differentiate between speakers. if voice of all person are alike, then it will be difficult to follow any radio program involving different people.
Voice conversion technique has many applications such as in gaming, in medical field, customization of text-to-voice systems, entertainment, special effects etc.
An inherent method of voice conversion of frequency warping based method in which the frequency of the source speaker is transformed into the desire frequency of the target speaker. Voice conversion by this method has a major disadvantage that it does not provide any information about the noise in the signal and also the frequency of our voice changes for the same voice because of many factors such as weather, way of voice etc.
In our project we are dealing with more than one spectral characteristic namely frequency and power spectral density to enhance the efficiency of the transformation.

2. Method of Transformation

Frequency-warping-based voice conversion is one of the best method of voice conversion, but its efficiency is not good and it does not provide any idea about distortion and noise in the voice signal. After every voice uttered our many of the characteristics can changes and noise is also added in the signal so in this paper, we are working for voice conversion with modifications in many characteristic such as power spectral density and frequency.

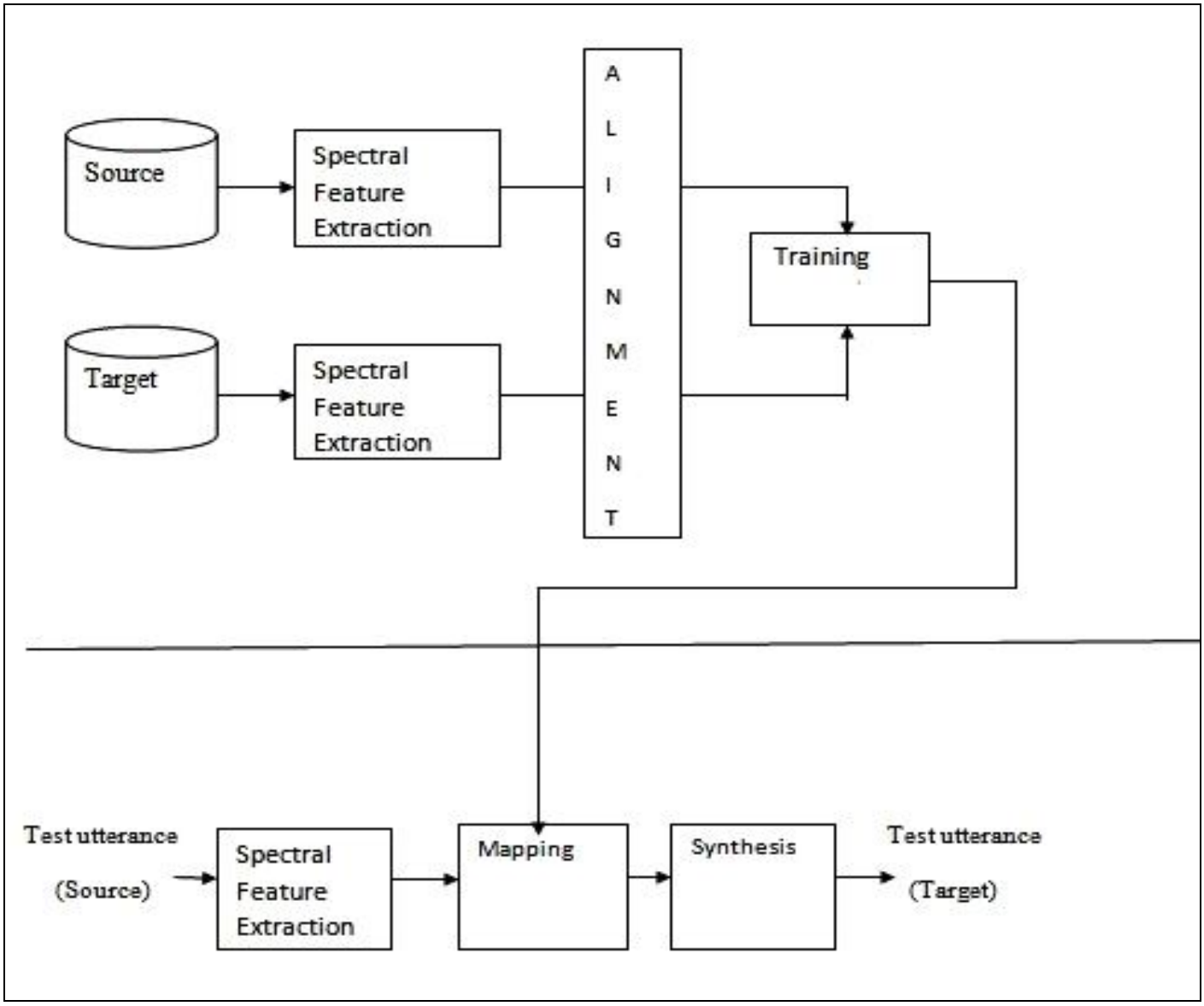

Figure 1: Block diagram of voice conversion

Since power spectral density gives the information about noise in the signal we are mainly concentrate on power spectral density and frequency. Building block of a voice conversion system is shown in figure 1. In this block diagram it is clear that first we extract the features i.e. spectral characteristics of both the source speaker and the target speaker.

Then in alignment stage analysis of the features of both speakers are done in this stage we analyze power spectral density and other features of both speakers.

In the next stage i.e. training stage the comparison of the spectral characteristic is done here mainly the power spectral density and frequency of both the signals are compared and the desire signal send to the mapping block after converting the parameter of voice of source speaker to the desire voice.

This desire signal is then goes to mapping stage where the process of expansion or suppression of the features of source voice with respect to the desire signal of training stage has done. Then this output of mapping stage is synthesis to provide the final output. So we can easily transform the voice of any one speakers to the another speaker.

3. Experimental Result

In all experiments, the transformation from source speaker to the target speaker was performed. We performed three experiments on different voicees with frequency and same experiments with power spectral density. We observed that experiments with power spectral density provides noise information and also provide 80 to 85% efficiency while the experiments with frequency does not give any information about noise and yields only 70-75% efficiency.

4. Conclusion

We proposed a new voice conversion technique to enhance the quality and efficiency of transformation and to know about the noise in our voice so that we can hear the transformed voice clearly. This improvement is a consequence of the use of power spectral density based transformation system. Our this method shows its ability in both changing speaker personality and preserving naturalness. This method is more reliable than other methods because in our project we are direct dealing with the spectral components not changing them in any type or coding or model

5. References

i. N. Iwahashi and Y. Sagisaka "Voice spectrum conversion based on soeaker interpolation and multifunctional representation with weighting by radial basis function networks ," voice commun., vol. 16. feb 1995

ii. Yannis Stylianou, "Voice transformation", Institute of computer science, FORTH, and Multimedia information lab, CSD, UoC, Greece, .IEEE, 2009.

iii. A. Kain and M. W. Macon. Spectral voice conversion for text-to-voice synthesis. Proc. ICASSP, Seattle, U.S.A., pp. 285–288, May 1998.

iv. Alexander Kain and Michael W. Macon. "Design and evaluation of a Voice conversion algorithm based on spectral envelope mapping and residual prediction", Center for Spoken Language Understanding (CSLU) 20000 NW Walker Road, Beaverton, 97006, USA.

v. Y. Minami, E. McDermott, A. Nakamura, and S. Katagiri. A theoretical analysis of voice recognition based on feature trajectory models. Proc. INTERVOICE, pp. 549–552, Jeju, Korea, Oct. 2004.

vi. Alexander Kain, Akiko Kusumoto, John-Paul Hosom, Jan van santen, "Voice Transformation, Increasing voice Intelligibility for the Hearing and Speaking impaired", Center For Spoken Language Understanding Oregon Health and Science University, May 2010.

vii. Ki Seung Lee, Dae Hee Youn , Il Whan Cha, "A New Voice Transformation Method Based On Both Linear and Nonlinear Prediction Analysis", Department of Electronic Eng., Yonsei University Seoul, 120-749, Korea.

viii. A. Mouchtaris, J. V. der Spiegel, and P. Mueller. Nonparallel training for voice conversion based on a parameter adaptation approach. IEEE Trans. Audio, Voice and Language Processing, Vol. 14, No. 3, pp. 952–963, 2006.

ix. Zdenek Hanzlicek and Jindrich Matousek. "Voice conversion based on probabilistic parameter transformation and extended inter-speaker residual prediction", University of West Bohemia, Faculty of Applied Science, Dpt. of Cybernetics,Univerzitni 8, 306 14 Plzen, Czech Republic.

x. David Sundermann, "Voice conversion: State-of-Art and future work", Universitat Politecnica de catalunya, 08034 Barcelona, Spain.

xi. H. Kuwabara and Y. Sagisaka. "Acoustic characteristics of speaker individuality: Control and conversion", Voice Communication, 16(2):165–173, 1995.

xii. Yannis Stylianou, Tomoki Toda and Alexander Kain, "Introduction to the special section on Voice Transformation", IEEE Transactions and audio, voice, and language processing, vol. 18. No.5, July 2010.